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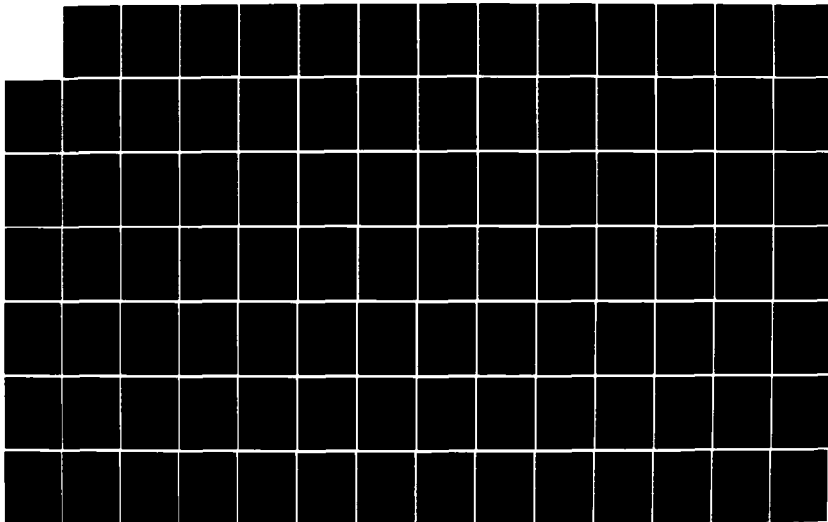
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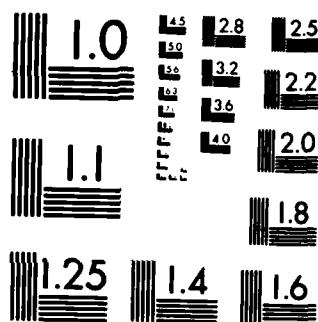
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LIFE CYCLE COSTING IN GOVERNMENT PROCUREMENT

by

Dennis Howard Shaw

B.Ch.E. May 1971, University of Louisville

J.D. May 1978, University of Louisville

A Thesis submitted to

The Faculty of

The National Law Center

of the George Washington University in partial satisfaction
of the requirements for the degree of Master of Laws

May, 1985

Thesis directed by
John Cibinic, Jr.
Professor of Law

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ABSTRACT

"Life Cycle Costing in Government Procurement"

by

DENNIS HOWARD SHAW
Major, USAF1985
203 pages

In the area of government procurement, Life Cycle Costing involves the consideration of post-acquisition costs, such as maintenance and operating expenses, in the making of decisions regarding the acquisition of goods and services. This thesis focuses on the use of life cycle costing techniques in determining the method of contracting and/or the determination of the recipient of a government contract in a competitive procurement in order to minimize the total cost of the acquisition from purchase to final disposal.

Emphasis is given to an examination of the interaction of the practical and legal constraints under which life cycle cost applications must operate. This examination is facilitated through a discussion of the concept and theory of life cycle costing and a review of the factors to be considered in deciding which procurements may benefit from its use. The development of evaluation criteria and its incorporation into a solicitation is also treated in detail. Finally, the use of mechanisms to prevent bidder from "gaming" such an evaluation is given concise treatment, including the use of post award price adjustment and warranty provisions to achieve this purpose.

Within this organizational framework, the thesis deals with the current constraints on the use of life cycle costing arising from various statutory requirements and the procurement guidance issued via Comptroller General Decisions. Although federal procurement materials form the basis for the majority of this work, treatment is also given to state procurement policies.

Primary Sources: Decisions of the Comptroller General
Federal Acquisition Regulation (FAR)

Secondary Source: DOD Publications LCC-1, LCC-2 and LCC-3

PREFACE

The author wishes to thank his advisor, Professor John Cibinic, Jr. for his guidance in the organization and research of this thesis.

Interpretations, theories and suggestions expressed by the author in this thesis are his own, and do not represent those of any firm, governmental agency, or other organization, which he is or has been associated.

TABLE OF CONTENTS

INTRODUCTION.....	1
CHAPTER I - THE CONCEPT AND THEORY OF LIFE CYCLE COSTS.....	3
A. Basic Requirements of the LCC Analysis.....	9
1. Determination of Post-acquisition Costs.....	10
2. Quantifiable Factors.....	10
3. Common Denominator.....	11
4. Determinable Life.....	13
5. Viable Alternatives.....	14
6. Accuracy.....	14
B. Applications of Life Cycle Costing.....	16
1. Establishing Requirements.....	17
2. Contractor or In-house Accomplishment.....	17
3. Life Cycle Costing and Specifications.....	19
4. Life Cycle Costing and Award Evaluations.....	24
5. Effect of Contract Method.....	25
CHAPTER II - DECIDING TO USE LIFE CYCLE COSTING.....	27
A. Legal Controls on the Use of Life Cycle Costing.....	28
1. Statutes.....	29
a. General Procurement Statutes.....	29
i. Advertised procurement.....	32
ii. Negotiated procurement.....	41
b. Specific Statutes.....	41
2. Regulations.....	52
3. The Future.....	56
B. Situations Requiring Life Cycle Cost Analyses.....	58
C. Desirable Uses of Life Cycle Costing.....	65
1. Consideration of the Item to be Procured.....	67
a. Single Suitable Item.....	68
b. Available Items have Similar Costs.....	69
c. Item maturity.....	71
2. Procurement Considerations.....	75
a. Competitive Alternatives.....	75
b. Performance Specifications.....	77

TABLE OF CONTENTS

D. Defending the Decision to Use or Not to Use LCC.	83
Chapter III. - PREPARING A SOLICITATION WITH LCC FACTORS...	86
A. Legal Requirements for LCC Solicitations.....	86
1. The Need for Solicitation Provisions.....	87
2. Specificity of LCC Provisions.....	89
3. Nature and Magnitude of the Factor.....	99
4. Accuracy of Available Data.....	102
5. Other Requirements.....	106
B. Solicitation Language.....	108
Chapter IV. - THE EVALUATION PROCESS.....	112
A. Developing the Evaluation Scheme.....	114
1. Establishing method of calculation and data needs	116
2. Availability and Source of Data.....	119
a. Evaluation testing.....	121
b. Third party data.....	124
c. Government data or estimates.....	125
d. Contractor supplied data.....	128
3. Feasibility of Data Source.....	130
a. Time constraints.....	130
b. Relative cost impact.....	132
c. Reliability of data.....	136
i. Timing.....	137
ii. Zone of uncertainty.....	139
iii. Sensitivity.....	140
4. Data Source Selection.....	141
B. Unannounced Evaluation Criteria.....	143
C. Alteration of Announced Evaluation Criteria...	146
1. New Factors.....	148
2. Changes in Announced Calculation Methods	151
3. Mathematical Changes.....	157
4. Rules in Making Evaluation Changes.....	158

TABLE OF CONTENTS

D. Evaluation Pitfalls.....	159
1. Alternate bids or offers.....	160
2. Discretionary factors.....	165
3. Technical evaluation v. Life Cycle Costing	167
4. Gamesmanship.....	169
 Chapter V. - POST AWARD REMEDIES.....	172
 A. Price Adjustments.....	173
1. Verification.....	174
2. The Price Adjustment Formula.....	176
3. Cost Sharing.....	182
 B. Latent Defects and Warranty Provisions.....	187
1. Latent Defects and Life Cycle Costing...	187
2. Warranties.....	192
 Conclusion - THE FUTURE OF PROCUREMENT LIFE CYCLE COSTING.	199

INTRODUCTION

The purchase price of equipment or any tangible property is only the first of several costs which the purchaser will incur while the property remains in his or her possession. Post acquisition costs vary in magnitude and nature depending upon the characteristics of the property as well as the use to which it is put. The costs of operating and maintaining many kinds of equipment are commonly sizable expenses when compared to their initial cost. With certain types of property, installation, security, repair and disposal are also significant cost factors. Although actually a far broader concept, the term "life cycle costs" or "life cycle costing"¹ when used in the field of government procurement has come to refer to the consideration of these "ownership" costs which follow the acquisition of goods prior to or during the procurement process itself.

As the supply and equipment needs of the government have increased in complexity the methods and products which meet these needs increasingly show significant variations in ownership expenses. Further the magnitude of such costs in comparison to an item's purchase price has also increased

¹ Hereafter "LCC" will sometimes be used to refer to either concept as indicated by the context.

INTRODUCTION

significantly. In many cases post-purchase expenditures can be expected to exceed, often by two or three times, the initial price of the product. As a result, the advisability of considering these expenses in making procurement decisions has become clear to a number of procurement policy makers.² While still quite limited, the consideration of post-acquisition costs is increasing and promises to be an area of significant development in the coming years. This thesis is an effort to present not only the limited legal precedent regarding the use of life cycle costing in the procurement process, but also to survey a number of the engineering and managerial requirements which have effected, and will continue to effect, and in fact, drive the evolution of life cycle cost processes within government procurement.

² See e.g., Comp. Gen. Report B-178214, May 21, 1973.*

CHAPTER I.

THE CONCEPT AND THEORY OF LIFE CYCLE COSTS

"Life Cycle Cost" is the term used to represent the total of all costs associated with the acquisition and ownership of an item or operational system from conception to disposal (the life cycle). While that cost may be accurately determined at the end of the item or system's useful life, the principle benefits derived from the evaluation of life cycle costs come through the approximation of total life costs prior to, or at least early in, the item's life, normally during the acquisition phase. The process of estimating the numerous factors which will comprise the costs of obtaining and utilizing property during its life is now generally referred to as Life Cycle Costing.

Life cycle costing is applied by individuals on a daily basis despite the fact that the term itself means little, if anything, to a majority of our society. A new car shopper considering the EPA fuel consumption ratings on the sticker of the cars he or she examines is life cycle costing one component of those cars' actual cost. To determine how much importance to attach to this particular component the shopper must estimate the number of miles they expect to drive and what the price of gasoline will be over the period

CONCEPT AND THEORY

of time they plan to own the car. If one considers that there are two EPA figures one for city driving and another for highway driving yet another estimate, the proportion of each type of driving they expect to do, is also significant. It is easy to see that life cycle costing of a complex system can involve hundreds of life cost components each of which may involve a number of estimates.

Unless our car shopper is a mathematician or engineer it is unlikely that he or she will formalize the estimates discussed above and reduce the component fuel cost of the new cars to specific dollar figures. Rather a series of subjective and unquantified "importance factors" will be assigned in deciding which car is best for the buyer. For many years business and government have often relied upon similar subjective evaluations in making acquisition decisions and in many areas continue to do so today. However, as business decisions grow in complexity the "gut" reaction approach to minimizing the total costs of placing and maintaining property in service becomes increasingly unreliable and impractical. Life cycle costing provides the methods to accurately evaluate a variety of business decisions with a reasonable certainty that decisions made based upon the analysis will provide the least costly way of accomplishing the business' objectives. Life cycle costing can be applied to a wide variety of human activities,

CONCEPT AND THEORY

including the management of human resources,³ however, from a procurement standpoint only life cycle costing of goods or services obtained by contract need be considered.

A "true" or academic life cycle cost analysis evaluates every cost which can be effectively considered from the conception of the need for an item until its final disposal. Many federal agencies have adopted this "cradle to grave" concept of life cycle costs. The Department of Defense has defined "life cycle cost" as:

... the total cost to the Government of acquisition and ownership of [a] system over its full life. It includes the cost of development acquisition, operation, support, and where applicable, disposal.⁴

The Office of Management and Budget, having responsibility for spending throughout executive agencies, has indicated that:

Life Cycle Cost means the sum total of the direct, indirect, recurring, non-recurring, and other related costs incurred, or estimated to be incurred, in the design, development, production, operations, maintenance and support of a major system over its anticipated useful life span.⁵

³ See Tansik, Chase & Aquilano, Management, A Life Cycle Approach, Richard D. Irwin, Inc., Homewood, Ill. 1980.

⁴ Department of Defense Directive No. 5000.28, "Design to Cost", Department of Defense, Washington, D.C., May 1975.

⁵ Office of Management and Budget (OMB) Circular No. A-109, "Major Systems Acquisition", Office of Management and Budget, Washington D.C., April 1976.

CONCEPT AND THEORY

The idea of life cycle costing is to evaluate competing systems on the basis of their total cost to the government. However, regardless of the contractor to whom award is made the preaward costs to the government are generally fixed and, therefore, may be ignored in the evaluation process. This allows a degree of simplification without any loss of overall accuracy and costs incurred prior to and during the contract award process are generally ignored except where the nature of a system acquisition decision requires their consideration. This is in accordance with the life cycle costing concept of "sunk" costs. A sunk cost is any cost which is irretrievably expended prior to the life cycle costing analysis of the system or item to which it relates. Life cycle costing is a tool to determine the best course of action to be taken in the future. The analysis always starts from the current situation (or the point in the future when present decisions can have meaningful affect). Previous decisions and the costs associated with them cannot be changed and, therefore, need not be considered (except for their value as predictors of future events) in determining the most cost effective approach to future operations.

Under "classic" life cycle costing the concepts of "price" and "life cycle cost" are the same. That is to say that the ultimate "price" to the purchaser of any object or

CONCEPT AND THEORY

service is what it will eventually cost that purchaser to own and use that item or service. Thus, strictly speaking, the consideration of the acquisition cost of any item is but a single component of a life cycle cost analysis. The Federal Acquisition Regulation (FAR) require that "price or cost to the Government shall be included as an evaluation factor in every source selection" made by negotiation.⁶ For contracts awarded by formal advertising the FAR provides:

The contracting officer shall make a contract award ... to that responsible bidder whose bid, conforming to the invitation, will be most advantageous to the Government, price and other factors considered.⁷

Thus, if "price" were defined to include all costs of ownership to the government, life cycle costing would be required in all government contracts. Price is not defined in the FAR and occasional references appear to include life cycle costs within price.⁸ However in practice, use of the word "price" is generally limited to the actual costs

⁶ FAR § 15.605(b) (1984).

⁷ FAR § 14.407-1(a) (1984).

⁸ See e.g., Administrative Requirements Governing All Grants and Agreements, 41 C.F.R. § 29-70.216-9(b)(2)(iv) (1983), where a Department of Labor regulation controlling contracts awarded under departmental grants provided that "[i]n formally advertised procurements, the recipient shall ... award a firm fixed price contract ... to the responsible bidder whose bid, conforming to the invitation for bids, is lowest in price. The recipient shall consider factors such as discounts, transportation costs and life cycle costs if the invitation provides for their consideration."

CONCEPT AND THEORY

incurred by the government incident to the contract, that is the acquisition costs of the goods or services for which the contract was made. This view, that price and life cycle costs are not the same, is supported by the FAR provision calling for evaluation based upon "the lowest price or lowest total cost to the Government...."⁹ The concept of "lowest cost to the government" is clearly one of life cycle costing thus use of the terms disjunctively implies that "price" encompasses a different concept.

"Price" is, of course, a component of any total life cycle cost analysis. However, consideration of price is required in all government procurements and for this thesis to deal with cases which turn only upon considerations of price would be to attempt to cover the entire spectrum of government contracting. Thus this discussion is limited to the treatment of situations where post-acquisition costs are or should be considered in the procurement process. In fact, despite the broad definitions quoted earlier the use of the term "life cycle cost" in government procurement has almost invariably been limited to cases where at least some

⁹ FAR § 15.605(c) (1984)(emphasis added).

CONCEPT AND THEORY

post-acquisition ownership costs are considered.¹⁰ Treatment is, however, afforded to situations where no attempt has been made to include all post-acquisition costs, that is to conduct a full life cycle cost analysis, but where one or more such factors are considered.

A. BASIC REQUIREMENTS OF THE LCC ANALYSIS

Life cycle costing is primarily a combination of engineering, economics and accounting. Each of these fields is vitally concerned with the accumulation and evaluation of information, almost invariably numerical information or data. Further these fields generally operate within rather rigid frameworks. This is also true of life cycle costing. At the theoretical level, life cycle costing can be reduced to mathematical formulas and equations. As with any equation, numbers must be available to plug into the formula or an answer is impossible. The general constraints and data requirements of life cycle costing have a significant effect on their use in procurement decision making and warrant detailed examination. The following is a survey of the minimum requirements for the productive use of life

¹⁰ Many of the procurement actions discussed herein appear to consider acquisition costs (i.e. price) as being outside the coverage envisioned by the term "life cycle cost" and provide for separate means of evaluating "price" and "life cycle costs". Such a system is not technically a proper application of life cycle costing, which dictates an equal evaluation of all cost contributions. However, the government procurement environment often dictates such a bifurcated discussion.

CONCEPT AND THEORY

cycle costing concepts in any decisional process. Chapter II discusses these requirements as directly applied to the procurement process.

1. Determination of Post-acquisition Costs

Having reached a working definition of "life cycle costs" as the expenses of ownership and use of property which follow its acquisition it is clear that life cycle costing is not applicable to purchases which generate no follow-on costs. However, life cycle costing is not useful merely because there will be costs incurred in owning and using property. Such costs must also be susceptible of identification, at least by broad, generalized category. This generally requires knowledge of the intended use of the item. The life cycle costs associated with the purchase of uncut timber will be radically different if the purchaser intends to burn the wood in nearby areas than if it is to be milled into construction lumber and transported to a building site. In actuality, however, this requirement poses no particularly difficult as property is seldom purchased without an anticipated use.

2. Quantifiable Factors

As with any mathematical equation, life cycle costing formulas require numbers to work. Thus to be fully effective all variables in the equation must be capable of

CONCEPT AND THEORY

being quantified. In the area of formally advertised procurements this has been the general rule for many years. To insure the integrity of the procurement system contract awards are allowed only on the basis of objective criteria.¹¹ However, negotiated procurements are often conducted because of the need to avoid this exact requirement. Award to other than the low bidder is allowed and often practiced in negotiated procurements.¹² However, just as price, a quantifiable term, is often "added" to a technical evaluation in subjectively determining the contractor to whom award will be made, a life cycle cost analysis may be used to establish a portion of any negotiated procurement's award criteria.

3. Common Denominator

The engineering element of life cycle costing requires that any comparison be measured in the same terms, thus not only must the data to be used in the life cycle cost analysis be numbers but those numbers must represent money. Thus even where a technical evaluation has been reduced to a numeric value (e.g. 47 points) this cannot be used in a life cycle costing analysis because the technical score cannot be directly added to the other life cycle costing factors which are expressed in dollars. Admittedly price and technical

¹¹ FAR § 14.407-1 (1984).

¹² See e.g. ADP Network Services, Inc., Comp. Gen. Dec. B-200675, 81-1 CPD § 157 (1981).

CONCEPT AND THEORY

scores can be meshed to achieve an overall numeric score for each bidder. However, such an evaluation meshes the factors by assigning arbitrarily established weighing factors, and what is achieved is, in reality, a subjective combination of several objective evaluations.¹³

For a fully accurate cost comparison all system costs must be adjusted to reflect the timing of their incident. This is a reflection of the business axiom that the use of capital, that is money, has a price of its own. This price is generally expressed as an "opportunity cost." Everyone, including the government, has a finite amount of money to spend at any given time. If one spends one dollar to buy a given item today that is one dollar less which may be spent on another opportunity. If nothing else, that dollar could be banked and allowed to earn interest. For this reason the "opportunity cost" of a business decision is often expressed in terms of the amount of interest which the money required by that decision would earn were it to be placed in a secure investment.

The purchase of an \$5,000 item with a five year life and no residual value¹⁴ may appear to be as good an investment as the lease of the same item for five years at a

¹³ See e.g. Matter of Univac Division of Sperry Rand Corp., Comp. Gen Dec. B-179875, September 12, 1974, Unpub.

¹⁴ Residual value is the value of an item when it is no longer economically useful for its intended purpose, i.e. at the end of its life cycle.

CONCEPT AND THEORY

cost of \$1,000 per year. Yet in the lease situation \$4,000 remains available for other uses during the first year and smaller sums in each of the subsequent years, thus, absent tax or other variations between lease and purchase options, the lease alternative will have a lower opportunity cost and thus enjoy a cost advantage over the purchase option. Opportunity costs are generally accounted for by reducing all future costs to current dollar amounts. Each expense which will be incurred at a later time is evaluated as the sum equal to the amount of current dollars which would have to be invested so that the amount with attendant interest is just equal to the amount of the expense on the day it will be incurred. Thus all post acquisition costs are reduced depending upon how far in the future they will occur. This adjustment is essential to an accurate life cycle cost evaluation, and should be performed in all life cycle cost comparisons.¹⁵

4. Determinable Life

Any life cycle cost analysis must be based upon a particular item life. Regardless of initial cost differentials in comparing the life costs of two items, the one with lower annual post-acquisition costs will always

¹⁵ Rather than treating this concept as an adjustment of all substantive costs to reflect their timing, current contract requirements appear to treat it as a separate and distinct cost in its own right. A discussion of the restrictions on the application of the use of the concept is discussed at pages 109-11, *infra*.

CONCEPT AND THEORY

appear cheaper if the item is assumed to have an unlimited life. Thus life cycle costing calculations must be based upon a closed system. The life period chosen is the time frame in which the property is expected to be used. In many cases this may be the physical life of the equipment, but may be a lesser period if the purpose of the acquisition will be accomplished prior to the anticipated deterioration of the goods themselves.

5. Viable Alternatives

Life cycle costing involves a comparison of possible courses of action to determine which is the most cost effective. Thus to achieve the purpose for which it is suited, a life cycle cost analysis must contain at least two alternative courses of action. In general, this requirement may be met by a comparison of the costs involved in taking a given action with the cost of a failure to act. Note however, that the cost of doing nothing may not be, and in fact seldom is, zero.

6. Accuracy

Being predictions of future events, much of the information which is needed to develop a life cycle cost analysis is speculative. The degree of uncertainty is dependent on a number of factors, primarily the nature and intended use of the product. Theoretically a life cycle

CONCEPT AND THEORY

cost analysis is possible regardless of the level of confidence in the data used in the process. In fact, however, as needed data becomes more and more suspect the ability of the LCC analysis to provide meaningful differentiation between alternatives requires larger and larger differences in the calculated total life costs of the alternative products. Where cost estimates cannot be made with even minimal confidence the LCC process is of no use whatever. However, as the actual magnitude of variance between alternatives cannot be determined until the LCC analysis is concluded, data in which limited confidence is felt can be used. Then if the ultimate cost variance between alternatives is small, use of the LCC results can be rejected as being of insufficient validity to serve as a discriminator.

These simple requirements indicate that a life cycle cost analysis can be performed on most decisions involving the purchase of goods and acquisition of many services. Thus from a technical stand point a life cycle cost determination can be made regarding the vast majority of procurement decisions. The procurement applications of the LCC concept are, however, far narrower than this expansive potential.

CONCEPT AND THEORY

B. APPLICATIONS OF LIFE CYCLE COSTING

One of the difficulties in "getting a handle" on the application of life cycle costs to government contracting is that the concept is generally broader in theory than in application. Further "life cycle costing" is often used to describe significantly different applications of this broad theory. In actuality life cycle costing can play at least four distinct roles which are part of, or relate to, the government procurement process. First, it can be used to determine the advisability of obtaining goods or services. Second, it can be used to evaluate the relative benefits of contracting out the work or performing it directly with government employees and resources. Third, it may be used in preparing the substantive specifications to be included in the solicitation. Lastly, it may be used as a tool to evaluate the relative merits of bids or offers submitted, and thereby directly effect the selection of the contractor to whom award will be made. Each of these "uses" can be said to apply to the procurement process, however, each involves quite different goals and processes. Confusion is the common result of labeling each of these applications "life cycle costing." Only the last application, "evaluation costing", is the direct application of life cycle costing to the procurement process. It is, however,

CONCEPT AND THEORY

important to understand the concepts involved in the other three, so that they may be distinguished from the latter.

1. Establishing Requirements

The establishment of a government requirement is, of course, indispensable to the procurement process, however, it is not normally considered a part of that process. The decision to obtain new goods or services is made on a daily basis at every level of government and is solely the concern of the functional government agency directly involved. Arriving at a firm requirement which is specific enough to allow preparation of a usable solicitation may involve life cycle costing, especially if the procurement contemplated is for a system to replace an existing operation which remains functional, though less efficient than its replacement would be. As precursors of the contracting process such decisions should be recognized as a life cycle costing application but need not be dealt with in this thesis.

2. Contract or In-house Accomplishment

Until recently the decision whether to obtain goods or services was strictly the function of the operational component of the organization. The degree to which life cycle costs were considered generally depended upon the sophistication of the agency involved, the nature of the requirement and the budgetary framework in which the agency

CONCEPT AND THEORY

was required to operate. Contracting experts were sometimes consulted to determine the feasibility of molding the requirement into a viable solicitation. More often however, the decision was made based upon historical considerations, i.e. how have similar requirements been satisfied in the past. In general most supplies were obtained by contract and services were performed with in-house personnel. Thus, the decision of whether to contract for work or rely on government resources was and still is most often made prior to significant contracting officer involvement and in all but the rarest cases prior to issuance of any solicitation regarding the requirement. Life cycle costing is the only effective way to compare the costs to the government of in-house verses contract performance as the elements of cost to the government from use of the two methods are radically different. However, again this type of life cycle cost analysis is seldom considered to be a direct part of the contracting process.

Contracting practice has, however, recently been injected into this particular phase of the procurement process to a limited extent by Office of Management and Budget (OMB) Circular A-76.¹⁶ That directive requires "in-house" work forces to "bid" against commercial contractors for certain types of work. The total cost to

¹⁶ "Performance of Commercial Activities", August 16, 1983, 48 F.R. 37110.

CONCEPT AND THEORY

the government is then determined using life cycle costing and if a contractor bidder is lower an award is made to him. If however, the government's "bid", in actuality an estimate of government performance costs, is low the solicitation is cancelled and the work performed by government employees. The General Accounting Office (GAO) has indicated it will consider bidder protests regarding these solicitations in the same way and to the same extent that it has all other solicitations, and that it will scrutinize the government bid to insure fairness to other bidders.¹⁷ However, GAO will not entertain complaints by government employee representatives that the government bid was unfairly evaluated.¹⁸ Although certain special considerations may be necessary in formulating the life cycle cost of in-house performance the basic principles of life cycle costing discussed here apply to this program as to other contract applications of LCC.

3. Life cycle costing and specification preparation

The consideration of life cycle costs in formulating specifications is a difficult concept, and has created and will probably continue to create significant misunderstanding of the position of life cycle costs in

¹⁷ ARA Services, Inc., Comp. Gen. Dec. B-211710, 84-1 CPD § 93 (1984).

¹⁸ Hawaii Federal Lodge No. 1998, International Association of Machinists and Aerospace Workers, Comp. Gen. Dec. B-214104, 84-1 CPD § 109 (1984).

CONCEPT AND THEORY

government procurement. To the extent that expected post-acquisition costs are considered in drafting the substantive contract specifications there has been an application of at least some facet of life cycle cost concepts. If, for example, a solicitation specifies that a particular vehicle must achieve at least 30 miles per gallon of fuel, the effects of operating costs have clearly been considered and a decision made (either intentionally or inadvertently) to give no consideration to a product with a lower initial price, but with post acquisition operating costs known to be higher than other available products. Inclusion of such specifications has been held to be a consideration of life cycle costs.¹⁹ Such specifications, which I will call "life cycle specifications", may be of the performance type as in the above example, or a design specification as in a requirement that a vehicle include special low friction wheels.

The problem with this approach is that it actually constitutes a violation of the basic premise of life cycle costing, to achieve the objective at the lowest cost over the system's life. An example relating to the 30 MPG specification will serve to illustrate the error of this approach. Assume that the lowest bid received on a solicitation for the purchase of fleet vehicles is \$10,000

¹⁹ General Motors Corporation, Comp. Gen. Dec. B-206486, 82-1 CPD § 584 (1982).

CONCEPT AND THEORY

per car and that it has an Environmental Protection Agency rating of 30 MPG as required by the fuel economy specification. Assume another bidder offered a car at \$10,200 which had achieved a rating of 40 MPG. Even if fuel is as little as \$1.00 per gallon the higher priced car will have the lower life cycle cost if the vehicle's life is at least 24,000 miles.²⁰ As there is no evaluation scheme to reward a bid for exceeding the level established by the specification, the government is obligated to award to the lower price despite the higher ultimate cost to the government.²¹ But in this case at least the government might have received the higher bid (assuming the bidder did not decide that his superior product would not be able to compete head to head on price with inferior products which conformed to the spec and therefore declined to bid) and, realizing the benefit of the "better" product, cancel the solicitation and try again. But consider another possibility, an auto manufacturer with a otherwise

²⁰ The examples discussed here do not consider the time cost of money which would, to a limited degree, increase the attractiveness of decreased initial price at the cost of higher operating expenses. Evaluation of the value of money over time is a cornerstone of life cycle costing and is discussed at pages 12-13, *supra*.

²¹ See Eastman Kodak Company, Comp. Gen. Dec. 8-194584, 79-2 CPD § 105 (1979). In 35 Comp. Gen. 291 (1955), a case factually similar to the previous example, however, the Comptroller General allowed, without persuasive justification, award to a contractor offering a 750 bank note per minute printing press despite the existence of other lower bids which met the 250 note per minute LCC specification contained in the solicitation.

CONCEPT AND THEORY

conforming car which rated a 29 on the EPA evaluation but which the maker would be willing to sell to the government for \$8,000. Even with that price and 21.00 per gallon the expected life of the car would have to exceed 870,000 miles before the more efficient, \$10,000 car would achieve a lower total cost to the government. Yet in this example the maker of the less expensive car would not even have submitted a bid because his vehicle does not conform to the specification and therefore his bid would be nonresponsive and entitled to no consideration.²² The government would be totally unaware of the missed opportunity.

These examples indicate the practical dangers of attempting to control post-acquisition expenses through specifications. The concept is equally flawed on a theoretical level. Whether one considers life cycle costing to be a scientific, engineering or accounting procedure (there are elements of each), the essence of the concept is to choose, based on least total cost, between all viable alternatives. A solicitation containing a life cycle specification must exclude a portion of the available alternatives from consideration. In fact, that is what it is designed and intended to do. By doing so prior to the accumulation of the relevant cost data, particularly price, the excluded alternatives cannot be evaluated and there can

²² EPA, 49, 50 (1974) (1974).

CONCEPT AND THEORY

be no assurances that the lowest total cost to the government will be realized.

Of course, if the restrictive specification is designed to assure a particular level of performance rather than limit post-acquisition costs then its validity rests upon a different ground. Care must be exercised to distinguish between the goals to be achieved by a "pure" life cycle specification (i.e. one designed only to limit costs) and those specifications prepared, at least in part, to assure a particular performance level established to insure that what is procured will properly accomplish the procuring agency's requirements. In some cases specifications which appear to be aimed at controlling post-acquisition costs, are in fact, designed to provide particular performance capabilities. For example, contract requirements specifying a minimum fuel efficiency might be intended, when coupled with a minimum fuel tankage requirement, to insure an aircraft would have sufficient range to accomplish its intended mission. Likewise a low level maintenance requirement might be needed due to the limited personnel available to perform maintenance tasks at a remote installation and not merely to decrease maintenance costs.²³ Such "performance specifications" are valid as a part of the minimum needs of the procuring agency. While the use of specifications

²³ See Westinghouse Electric Corporation, Comp. Gen. Dec. B-195561, 80-1 CPD ¶ 322 (1980).

CONCEPT AND THEORY

solely to limit post acquisition costs has been challenged on occasion, their validity has never been directly considered on the merits.²⁴ Any complaint regarding the substance of a solicitation must be made to the Comptroller General prior to bid opening to be considered.²⁵ In the single case where the Comptroller General obliquely considered the propriety of LCC specifications, the decision failed to consider the practical life cycle costing considerations and resolved the case on a purely statutory ground.²⁶ Although there is no reason to believe the use of life cycle specifications are illegal, sound procurement practice dictates that, absent a performance justification, factors designed to control post-acquisition costs should be incorporated into the evaluation process and not included as substantive specifications.

4. Life cycle costing and award evaluations

This then leaves the fourth and most important use of life cycle costing in government procurement, its use in determining the most advantageous award based upon the

²⁴ See e.g., Trident Motors Inc., Comp. Gen. Dec. B-213458, 84-1 CPD § 142 (1984).

²⁵ Sandia Die & Cartridge, Comp. Gen. Dec. B-211555, 83-2 CPD § 324 (1983). The controlling Comptroller General Bid Protest Procedure is published at 4 C.F.R. § 21.2(b)(1) (1984).

²⁶ General Motors Corporation, Comp. Gen. Dec. B-206486, 82-1 CPD § 584 (1982). See notes 69-82, and accompanying text, *infra*.

CONCEPT AND THEORY

responses received to a government solicitation. This area is the one most fraught with statutory and regulatory restrictions and numerous practical problems. As such, its use, while growing dramatically in recent years, has been limited. It is, however, the use normally associated with the term "life cycle cost" and the procedure having the greatest potential for increased utilization and benefit to the government. The thrust of the remainder of this thesis is an examination of the theory, restrictions, and procedures governing the use of life cycle costing to evaluate bids and proposals and make award of government contracts.

5. Effect of Contracting Method

Life cycle costing can be of value in many contracts regardless of the form of contract being contemplated. In fixed price contracts the characteristics of the products being offered are generally the sole concern of the procuring activity. In cost type contracts, however, these factors are often secondary to considerations which give insight into the various contractors' ability to produce the desired product at the least possible cost. To the extent that elements of the total production cost vary or could vary between bidders or offerors these costs (e.g. labor, transportation of materials, tooling) may be characterized as LCC factors and treated accordingly, rather than as part

CONCEPT AND THEORY

of the acquisition price.²⁷ Admittedly, the consideration of a contractor's potential production costs, while extensive, is not normally referred to as an LCC process. Nevertheless such costs may serve as valid evaluation factors and much of the following discussion can be applied to such factors.

²⁷ Thus, a cost reimbursement contract may be treated as being composed strictly of LCC factors and having no "price" in the sense that price and LCC were distinguished earlier.

CHAPTER II.

DECIDING TO USE LIFE CYCLE COSTING

The use of life cycle costing in making a contract award determination cannot and will not expand until its use is given adequate consideration during the early phases of the procurement process. In many cases the benefit which may be derived from the use of a life cycle cost analysis is obvious and clearly significant. In a very few cases mere intuition indicates it will be of no significance at all. However, for large numbers of situations the benefits of including life cycle cost factors in award evaluation criteria involves a trade off which requires considerable thought. The benefit to be achieved is measured by the likelihood that an award based on life cycle costs will result in a lower ultimate cost to the government and the potential magnitude of such a reduction. However, as the Department of Defense has noted:

[a] situation must be avoided where the added expense of incorporating life cycle cost procedures will outweigh the expected total cost savings....²⁸

²⁸ DOD Publication LCC-1, "Life Cycle Costing Procurement Guide (Interim)", Department of Defense, Washington, D.C., July 1970 at para. 2-1.

DECIDING TO USE

This expense results from increased costs in both the award process and, in many cases, the administration of contracts containing life cycle costing criteria. These costs are directly attributable to the added complexity a life cycle costing analysis interjects into the procurement process. This chapter discusses the factors which impact on the decision to use or not use life cycle cost factors in the award criteria of a given procurement.

A. LEGAL CONTROLS ON THE USE OF LIFE CYCLE COSTING

Federal statutory and regulatory provisions fail to provide viable guidance on when to use or not to use life cycle costs in the award evaluation process. Were they to do so, the determination to use or not to use life cycle costing in award evaluation would be a matter of mere mechanical application of such requirements.

The benefits of the use of life cycle costing in selecting the bidder or offeror to receive a particular contract are now widely understood and accepted in both

DECIDING TO USE

federal²⁹ and state³⁰ government procurement. This acceptance is, however, of relatively recent vintage and the use of considerations other than price was strictly prohibited for many years. These restrictions were not designed to limit the application of life cycle costing but rather to prevent abuse of the procurement process. Nevertheless they have retarded growth in the use of LCC considerations and continue, to at least a limited degree, to adversely effect the willingness of contracting officers to make full use of life cycle cost analysis in the award determination process. A brief examination of the process by which life cycle costing has come to be accepted aids in understanding its current status and the role statutory and regulatory authority play in defining its limitations.

1. Statutes.

a. General Procurement Statutes.

The statutes establishing the overall procurement system of the United States make no mention of life cycle costing. However, the concepts and policies dictated by

²⁹ See e.g., Comp. Gen. Report B-178214, May 21, 1973, where the Comptroller General recognized the benefits of life cycle costing and recommended increased use of LCC evaluations in contract decision-making.

³⁰ In a 1979 survey of state procurement authorities twenty indicated they used life cycle costing in evaluating the purchase price of at least some products. State and Local Government Purchasing, The Council of State Governments, Lexington, Ky., 1983, at 149-50.

DECIDING TO USE

these statutes are broad enough to apply to the application of life cycle cost analyses to award of any government contract. At times the same statutory provisions have been interpreted as both requiring³¹ and prohibiting³² the use of specific life cycle cost factors.

By 1820 the requirements that contracts be awarded based on advertising and to the low bidder were firmly entrenched in the United States. During this timeframe the needs of the United States were modest in keeping with its limited responsibility in the federal system of government as it was then understood. The primary areas of procurement were real property, military equipment and administrative supplies. Goods were generally fungible and of limited complexity. To prevent favoritism in contract actions the government was absolutely required to award all contracts to the low bidder unless the bidder failed to provide the required bond.³³ The government stated its needs in the advertisement and by accepting award the contractor agreed to furnish what was specified. No subjective evaluation of any type was allowed.

World War I brought the first chink in the invincibility of the "price only" award requirement.

³¹ See 14 Comp. Gen. 268 (1934).

³² See 33 Comp. Gen. 108 (1953).

³³ 21 Op. Att. Gen. 56 (1894).

DECIDING TO USE

Although bemoaning the inadvisability of the action, the Comptroller of the Treasury allowed (but refused to take responsibility for) price adjustments based upon transportation costs to the point of delivery.³⁴ By 1938 such adjustments were commonplace and sanctioned by the Comptroller General.³⁵ Although clearly a form of life cycle costing the acceptance of transportation adjustments was not, with rare exceptions,³⁶ accompanied by the acceptance of other life cycle cost factors into the award evaluation process. With the passage of the Armed Services Procurement Act of 1947³⁷ procurement by negotiation became acceptable in many types of procurement. The use of subjective evaluation factors was specifically approved for this method of contracting.

³⁴ 25 Comp. Dec. 679 (1919). The contract provision at issue in the decision clearly showed how the "price only" evaluation mentality was firmly implanted. All bidders were required to bid on steel wire F.O.B. Pittsburg and award was based on these prices. Actual payments were then calculated by adding theoretical freight charges from Pittsburg to the place of delivery and subtracting the actual charges from the place of manufacture to the delivery location.

³⁵ 18 Comp. Gen. 44 (1938).

³⁶ 14 Comp. Gen. 268 (1934) (inclusion of estimated fuel expenditures as bid evaluation factor proper in purchase of tractors). See also 14 Comp. Gen. 37 (1934) (inclusion of maintenance services in foreign telephone service contract proper).

³⁷ 62 Stat. 21 (1949).

DECIDING TO USE

1. Advertised procurement

(A) Federal Law

Advertised procurement generally remained subject to the historic "price only" limitations despite new statutory language allowing consideration of "other factors" in advertised contracts.³⁸ For example the Comptroller General disapproved the inclusion of expected trade in values in the evaluation criteria for automobile purchases stating:

if depreciation were to be a factor in determining the lowest net eventual cost to the Government, why should not the expense of operation and even maintenance also be considered? ... (T)to introduce the element of prospective depreciation into the procurement of automobiles would eventually lead to all kinds of confusion and uncertainty in the administration of the advertising for bids statutes and is not contemplated or authorized under the law.³⁹

It is unclear whether the Comptroller General was leery of the ability of contracting officers to manipulate the award decision with the inclusion of specific post acquisition costs, or simply skeptical of the ability of life cycle costs to actually achieve lower contracting costs to the government.

³⁸ 41 U.S.C. § 253 (1982), established as part of the Federal Property and Administrative Services Act of 1949, 63 Stat. 377 (1949) (civilian agencies) and 10 U.S.C. § 2305(c) (1982), a part of the Armed Services Procurement Act of 1947, 62 Stat. 21 (1949).

³⁹ 33 Com. Gen. 108, 109 (1953).

DECIDING TO USE

In any event the statutory language under which life cycle cost factors were specifically disallowed has not been changed since this period. Thus there may remain some questions about the propriety of evaluating post-acquisition cost factors in making award of advertised contracts. This attitude is unfortunate but not surprising in light of the failure of the Comptroller General to adopt any clear cut approach to the consideration of life cycle costs in the 1960s and early 70s. Although specific life cycle cost factors were occasionally expressly approved⁴⁰ there were also a number of decisions questioning the accuracy of life cycle costing, and while its use was not expressly disapproved there were often statements such as:

[Costs which may be difficult to quantify should not be used as a factor in bid evaluation except after thorough study and consideration of the pros and cons by all interested agencies, [and] establishment of proper criteria for the use of the factor....⁴¹

or

We have emphasized the necessity for exactitude in the establishment of a specific cost evaluation factor.⁴²

To complicate matters the problem was not adequately addressed in the procurement regulations, a situation which,

⁴⁰ See e.g. Will J. Davis, Comp. Gen. Dec. B-171798(1), August 18, 1971, Unpub.(salvage value).

⁴¹ 45 Comp. Gen. 433, 435 (1966) citing Comp. Gen. Dec. B-156582, July 16, 1965, Unpub.

⁴² 50 Comp. Gen. 637, 641 (1971).

DECIDING TO USE

unfortunately, was not remedied with the adoption of the FAR. FAR § 14.407-1(a) provides:

The contracting officer shall make a contract award ... (3) to that responsible bidder whose bid, conforming to the invitation, will be most advantageous to the Government, price and other factors considered (for a discussion of other factors to be considered, see § 14.407-5).

Unfortunately § 14.407-5 specifies six "other factors" none of which are generally applicable to life cycle costs.⁴³ Thus an argument exists that only price and the six factors of § 14.407-5 can be considered.

Fortunately, despite early language to support a limited reading of "other factors"⁴⁴ the Comptroller General has now given the term a broad interpretation⁴⁵ and has sanctioned the consideration of life cycle costs in

⁴³ Although FAR § 14.407-5(a) (1984) requires that transportation costs, a life cycle cost factor, be evaluated in certain circumstances.

⁴⁴ In 28 Comp. Gen. 662, 664 (1949), the Comptroller General stated:

[w]hile the term 'other factors' ... is not expressly defined it seems clear that such term was not intended to be given other than its customary or usual meaning, i.e. it comprehends such factors as an evaluation of the bidders experience, reputation, financial stability, and ability to perform the contract.

In short "other factors" would be limited to those factors concerned with responsibility and not the substance of performance.

⁴⁵ See e.g. Sayles Biltmore Bleacheries, Inc., Comp. Gen. Dec. 3-185252, 76-2 CPD § 53 (1976) ("other factors" authorizes consideration of transportation costs).

DECIDING TO USE

general⁴⁶ and the use of a number of specific life cycle cost factors.⁴⁷ Although no court has had occasion to speak on this issue in recent years, there is no reason to believe that life cycle costing, properly applied, would be found to violate current procurement law or regulations. Federal contracting officers should consider life cycle costing in advertised procurements whenever appropriate.

In fact, a reasonable argument exists that evaluation of life cycle costs is not only allowed in advertised federal procurement but is required. The Armed Services Procurement Act of 1947⁴⁸ requires that in every procurement conducted by formal advertising:

Awards shall be made ... to the responsible bidder whose bid conforms to the invitation and will be most advantageous to the United States, price and other factors considered.⁴⁹

⁴⁶ Hasko-Air, Inc., Comp. Gen. Dec. B-192488, 79-1 CPD § 190 (1979) at 4, holding with considerable overstatement:

We have consistently upheld life cycle costing, stating that it is logical to consider total anticipated costs, rather than merely purchase price.

⁴⁷ See e.g. Leon Whitney, Certified Public Accountant, Comp. Gen. Dec. B-190792, 78-2 CPD § 420 (1978)(cost of employee travel); Conic Corporation, Comp. Gen. Dec. B-187979, 77-1 CPD § 304 (1977)(maintenance costs); 52 Comp. Gen. 905 (1973)(cost of changing contractors for ongoing service work); 51 Comp. Gen. 645 (1972)(value of shorter performance time in construction contract).

⁴⁸ 62 Stat. 21 (1949).

⁴⁹ 10 U.S.C. § 2305(c) (1982).

DECIDING TO USE

This language could easily be read as requiring a life cycle cost analysis in each such procurement, and that every award be based upon the lowest total cost to the government under that analysis. "Other factors" is clearly broad enough to include future costs which could be anticipated at the time of award. Further the consideration of these factors is required by the imperative "shall". However, such an interpretation has been consistently rejected. Not only have disappointed bidders argued, without success, that the government must consider "other factors"⁵⁰ but the government itself has occasionally been thwarted in an effort to give this provision a broad interpretation.⁵¹ Regarding the effect of "other factors considered" the Comptroller General has held:

this statutory provision first appeared in section 3(b) of the Armed Services Procurement Act of 1947, 62 Stat. 23, 41 U.S.C. 152 (1952 Ed.), and the legislative history of that statute indicates clearly that it was not intended to broaden the scope of then existing authority or to introduce new factors into the evaluation of bids submitted in response to advertised procurements. ... 'other factors considered' does not authorize and was not intended to authorize the awarding of contracts

⁵⁰ See e.g., 42 Comp. Gen. 467 (1963).

⁵¹ 37 Comp. Gen. 550 (1958) ("other factors considered" does not authorize technical evaluation of bidders in advertised procurement).

DECIDING TO USE

... to other than the low, responsible, qualified bidder.⁵²

While this provision has been held to allow consideration of life cycle cost factors,⁵³ it does not appear that any bidder has attacked a procurement directly on the grounds that the statute requires life cycle costing.

(B) State Law

State statutory requirements for formal advertising have also recognized that evaluation of factors other than price may be beneficial, and they have provided for the consideration of such factors, including life cycle costs, with the use of "the quality of the articles to be

⁵² 42 Comp. Gen. 467, 472 (1963). See also 50 Comp. Gen. 447 (1970). A close reading of the legislative history indicates that this position is supported more by the absence of any discussion of of this provision (while others making significant changes in the procurement process were discussed at length) rather than by any clear statement of intent. See Senate Report 571, July 16, 1947 and House Report 109, March 10, 1947. Note, however, that the Senate report contains the following language implying that "other factors" may have envision a life cycle cost analysis:

[T]he committee also recognizes that during the time [existing] legislation has been in effect a substantial number of strict interpretations have been made, out of which has grown the present traditional approach that Government contracts must be awarded primarily on a lowest-price basis, irrespective of the best public interest or of lowest ultimate cost. While existing law does not require this result it is nevertheless a fact. (emphasis added)

⁵³ Sayles Biltmore Bleacheries, Inc., Comp. Gen. Dec. B-185262, 76-2 CPD § 53 (1976) (transportation costs),

DECIDING TO USE

supplied"⁵⁴ , "price and other factors,"⁵⁵ or similar language.⁵⁶ The Model Procurement Code for State and Local Government provides for bids to be evaluated:

based on the requirements set forth in the Invitation for Bids, which may include criteria to determine acceptability such as inspection, testing, quality, workmanship, delivery, and suitability for a particular purpose. Those criteria that will affect the bid price and be considered in evaluation for award shall be objectively measurable, such as discounts, transportation costs, and total or life cycle costs.⁵⁷

Four states, however, retain language calling for award to "the lowest responsible bidder," which could be, and historically has been, construed as requiring award strictly on the basis of purchase price.⁵⁸

⁵⁴ Colo. Rev. Stat. § 24-103-202 (1982). See also e.g. Neb. Rev. Stat. 81-161 (1981).

⁵⁵ N. J. Rev. Stat. § 52:34-12 (1955). See also e.g. Ariz. Rev. Stat. § 41-730 (1974).

⁵⁶ See e.g. Ill. Ann. Stat. ch. 127, § 132.6a (1981) (serviceability); Utah Code Ann. § 63-56-21(6) (Supp. 1983) (most advantageous to the State) and Ky. Rev. Stat. Ann. § 45A.080(5) (Bobbs-Merrill 1983) (lowest evaluated bid price).

⁵⁷ Model Procurement Code for State and Local Government, § 3-202(5), American Bar Association, Washington, D.C., February 1979.

⁵⁸ Alaska Stat. § 37.05.230(1) (1983); Haw. Rev. Stat. § 103-32 (Supp. 1983); Or. Rev. Stat. § 279.029 (1983) and Pa. Stat. Ann. tit. 71 § 1612 (1962). However Hawaii and Pennsylvania procurement officials indicated they have used life cycle costing in their states. State and Local Government Purchasing, The Council of State Governments, Lexington, Ky., 1983, at 149-50.

DECIDING TO USE

At least two states have specifically addressed the use of life cycle costing in their general procurement statutes. In 1978 New Jersey amended its basic statute to provide that the criteria utilized in all contract award evaluations:

shall, wherever practicable, include such factors as life cycle costs ... as shall be deemed effective by the Director of the Division of Purchase and Property.⁵⁹

Although providing discretion in the use of life cycle costs in any given procurement the statute does establish at least an express preference for consideration of LCC factors in state award procedures. It should give bidders grounds for legal action in cases where the use of specific life cycle cost factors has clearly been demonstrated to be workable and beneficial and the procuring agency declines to include them.⁶⁰

⁵⁹ N.J. Stat. Ann. § 52:34-12 (Supp. 1983).

⁶⁰ Note, however, that as in many judicial standards applicable to the review of administrative determinations the burden on protestors is high. Only "bad faith, corruption, fraud or gross abuse of discretion" will warrant judicial interference in a New Jersey contract award determination. Matter of Honeywell Information Systems, Inc., Protest of Contract Award Requisition X-32, 145 N.J. Super. 187, 367 A.2d 432 (N.J. Super. Ct. A. D. 1976). Despite such express standards however, in recent years judges appear more inclined to find abuse of discretion where the procuring agency is unable to articulate adequate grounds for its failure to follow state standards which were established to insure contract awards in the best economic interest of the state. See e.g. Keyes Martin & Co. v. Director, Division of Purchase and Property, 196 N.J. Super. 52, 481 A.2d 572 (N.J. Super. Ct. A. D. 1984).

DECIDING TO USE

Nebraska has provided:

In determining the lowest responsible bidder, in addition to price, the following elements shall be given consideration:

...
(6) The life-cost of the article or property in relation to the purchase price and specific use of the item⁶¹

This statute appears to allow no discretion, requiring a life cycle cost analysis in all state procurements. However, "consideration" may be construed to require no more than that the procuring agency think about an article's post-acquisition expenses at some point in the procurement process. In this case such an interpretation may be warranted due to (1) application of the interpretive rule of ejusdem generis as many of the factors with which the LCC requirement is grouped are susceptible of only subjective consideration and (2) the potential impracticability of applying full LCC evaluations to all items purchased for state use.⁶² Such an interpretation effectively provides almost unlimited discretion to the procuring agency in deciding whether to use LCC factors or not.⁶³ Thus while

⁶¹ Neb. Rev. Stat. § 81-161 (1981).

⁶² This argument is based on the theory that as such consideration is unworkable the legislature must have intended a more plausible and, therefore, restrictive interpretation.

⁶³ See General Motors Corporation, Comp. Gen. Dec. B-206486, 82-CPD § 584 (1982), discussed at notes 69-82 and accompanying text, *infra*.

DECIDING TO USE

appearing more forceful, the actual potency of the Nebraska provision may prove to be less than it's New Jersey counterpart. To date no reported decisions have considered either provision.

ii. Negotiated procurement

The historical restrictions on subjective evaluation factors has never been applied to contracts awarded by negotiation. Current regulations with regard to negotiated procurement provide:

The factors that will be considered in evaluating proposals should be tailored to each acquisition and include only those factors that will have an impact on the source selection decision.⁶⁴

Contracting officers are allowed broad discretion in selecting criteria for inclusion in Requests for Proposals (RFP) and the use of life cycle cost factors in the award determination has been consistently upheld.⁶⁵ The majority of procurements utilizing life cycle cost factors appear to be negotiated.

b. Specific Statutes

Although few examples are currently in effect, life cycle costing can be made a required evaluation technique in

⁶⁴ FAR § 15.605(a) (1984).

⁶⁵ See e.g. Remington Rand Corporation; SCM Corporation; Olivetti Corporation, Comp. Gen. Dec. B-204084, B-204085, B-204085.3, B-204085.6, 82-1 CPD § 408 (1982).

DECIDING TO USE

statutes providing for the procurement of certain items or types of items. In such cases specific type of LCC factors maybe anticipated and included within the statute. Since 1966⁶⁶ Congress has passed several statutes which require the consideration of life cycle costs in the requirement identification stage⁶⁷ of the preprocurement process.⁶⁸ Only very recently, however, has our federal legislature made the first attempt to mandate the use of life cycle costing in the procurement process itself. As with many procurement decisions the vast diversity of federal procurement actions dictates that contracting agencies be granted significant discretion in implementing life cycle costing in the award of contracts. The need for wide discretion is much reduced, however, in procurements for standard commercial products. Further the energy crisis of the middle 70s has created a significant awareness of the benefits of life cycle costing procurements involving the purchase of energy consuming products. Thus it is not surprising that the first statutes dictating the use of life

⁶⁶ See Military Medical Benefits Amendments of 1966, 80 Stat. 862 (1967) (requiring consideration of alternatives in establishing new federal medical care facilities).

⁶⁷ See generally pages 19-24.

⁶⁸ See e.g. 42 U.S.C. § 5556a(a)(1)(A) (1982) (requiring the Secretary of Energy to conduct an evaluation of the energy savings which could be effected by installation of solar systems in existing public installations) and 10 U.S.C. § 2857 (1982) (requiring consideration of solar energy in new military construction designs).

DECIDING TO USE

cycle costing in making an award decision would deal with an energy consuming commercial commodity, buses. As amended in 1979 The Urban Mass Transportation Act of 1964 provided:

...contracts for the acquisition of rolling stock, including buses, which will result in the expenditure of Federal financial assistance under [this] Act, may be awarded based on consideration of performance, standardization, life-cycle costs, and other factors the Secretary [of Transportation] may deem relevant, in addition to the consideration of initial capital costs.⁶⁹

The legislative history makes it clear that use of the word "may" was only designed to excuse use of the stated criteria "in those cases where it obviously would not be required."⁷⁰ Further the applicable appropriation act used the same language except the word "shall" and not "may" was used.⁷¹ It then becomes clear that Congress' intent was that the buses to be bought under the Act be obtained through "contracts ... awarded based upon consideration of

⁶⁹ Section 12(b)(2), Urban Mass Transportation Act of 1964, as amended by the Federal Public Transportation Act of 1978, § 308, 92 Stat. 2735, 2745 (1980)(later amended [see note 82, *infra*]).

⁷⁰ House Report No. 95-1485, 95th Cong., 2nd Sess., reprinted in 1978 U.S. Code Cong. & Ad. News 6575, 6632. The use of "may" is an apparent indication that Congress was concerned about the degree the statute would remove discretion from the contracting officer.

⁷¹ Department of Transportation Appropriations Act, 1980, 93 Stat. 1023 (1980).

DECIDING TO USE

performance, standardization⁷², [and] life-cycle costs...."

The most logical and practical reading of this language is that these factors should be taken into account in determining the bidder to receive the contract award. However, the only decision to consider this statutory provision reached another conclusion.

The Pennsylvania Department of Transportation issued an invitation for bids for the procurement of buses under a grant from the Urban Mass Transit Administration (UMTA) made pursuant to the Act. The invitation failed to include any evaluation criteria regarding performance or life-cycle costs. General Motors protested the invitation for bids (IFB) before award as violating the above quoted statute. Despite the clear import of the statutory language and Congressional committee report UMTA claimed the solicitation was not defective as the Urban Mass Transportation Act did not require consideration of life-cycle costs and the other factors but merely permitted them to be considered.⁷³ This position was based upon a formal agency interpretation⁷⁴ that the appropriations acts of 1980 and 1981 required only

⁷² The principle benefits of standardizing bus fleets is the minimization of maintenance and repair facilities and spare part inventories. Thus standardization can be considered a life cycle cost factor which Congress chose to require consideration of in specific terms.

⁷³ General Motors Corporation, Comp. Gen. Dec. B-206486, 82-1 CPD § 584 (1982) at 3.

⁷⁴ Rolling Stock Procurement: Additional Statutory Requirements and Program Guidelines, 45 Fed. Reg. 32224 (1980).

DECIDING TO USE

"consideration" of the factors and that specifications listing certain performance and maintenance requirements, together with a requirement that the contracting state agencies certify they had considered the factors, met the statutory requirement.⁷⁵

The Comptroller General upheld the agency position stating "the term 'consideration' is subject to a variety of interpretations."⁷⁶ The issued opinion implicitly supported the agency rationale because "[t]he...specifications do consider the factors in performance and maintenance specifications and in requiring certain components and features."⁷⁷

The agency position, and GAO's support of it, appear to be a misreading of the Congressional intent. The Act's language would be totally unnecessary if the purpose was to permit consideration of life cycle costs in these fixed price contracts. Agencies have enjoyed, subject to certain procedural requirements, the right to consider such factors in making awards for a number of years.⁷⁸ Nor does the rationale that establishment of performance and maintenance

⁷⁵ General Motors Corporation, *supra* at 3.

⁷⁶ *Id.* at 4.

⁷⁷ *Id.* The opinion fails to discuss the fact that standardization, a life cycle cost specifically addressed in the Act, was in no way "considered" in the performance or maintenance standards included in the specifications.

⁷⁸ Cf. 52 Comp. Gen. 679 (1973).

DECIDING TO USE

minimums fully satisfy the objectives of life cycle costing. Such standards may prevent a "worst case" procurement of vehicles with low initial cost but exorbitant post-acquisition costs, but do nothing to achieve the lowest possible system cost or to encourage bidders to provide anything except a conforming item at the least production cost. Perhaps in answer to UMTA's published interpretation Congress altered the provision slightly, but significantly, in the applicable 1982 appropriations act. That act provided for expenditures on the program only "after an evaluation of" performance and life cycle costs.⁷⁹ Use of the word "evaluation" rather than "consideration" carries a further indication that what was desired was that evaluation of bids be conducted based on life cycle costs. It appears that the Department of Transportation, in 1982 guidelines for grantees, recognized that the altered language requires use of the stated criteria for evaluation of bids.⁸⁰ However, whether "evaluation" required the use of objective criteria in making the award determination has not been adjudicated. To date no federal statute specifying life cycle costing factors be taken into account has generated a decision which requires use of life cycle costing factors in an evaluation determination.

⁷⁹ Department of Transportation Appropriations Act, 1982, 95 Stat. 1442 (1982).

⁸⁰ Rolling Stock Procurement: Additional Statutory Requirements and Program Guidelines, 47 Fed. Reg. 7361 (1982).

DECIDING TO USE

The difficulty of drafting a procurement statute which provides sufficient flexibility for the procuring agency while ensuring compliance with the legislative intent is a common problem. Even if the statute clearly dictates the use of life cycle costing it may not address the type of life cycle costing factors to be used. If the statute lacks specific guidelines the procuring agency will be allowed broad latitude in determining the extent of the requirements of the statute as they relate to its activities.⁸¹ Thus legislative bodies need have little fear of depriving executive agencies of needed discretion by requiring life cycle costing be utilized in the award process if the agencies enjoy sufficient latitude in deciding which factors to utilize and the manner in which the factors are shaped in the evaluation format. If the contorted statutory interpretation given the Urban Mass Transportation Act was designed to "protect" agency discretion it was totally unnecessary as that act failed to specify which life cycle costs (other than standardization) should be considered. Nevertheless apparently under agency lobbying, mandatory use of life cycle costs in this area was written out of the law

⁸¹ In General Motors Corporation, *supra* at 3, UMTA argued and the Comptroller General accepted that as there were:

no legislative guidelines concerning what consideration of [life cycle costing] factors means, as the primary administering agency, its interpretation should be accorded great weight.

DECIDING TO USE

in 1983⁸² and the entire statutory enterprise must be regarded a total failure, boding ill for future efforts to increase the use of life cycle costing in federal procurement through the legislative process.

Of course, the object of a statute of the type under discussion is to require meaningful use of life cycle cost evaluation in the contract process. Failure to specify at least some of the factors to be "plugged" into the award evaluation may result in a statute which fails to achieve the desired result.

The obvious answer is to make the statute more explicit. Examples of this approach can be seen in a number of recent state statutes regarding the consideration of life cycle costing in new public buildings. While these statutes do not apply directly to the award procedure they do demonstrate the ability of a legislature to specify categories or specific criteria to be used in a life cycle cost analysis. The statutes are intended to ensure that life time energy costs, and in some cases maintenance costs, of a building are considered in the design process. They not only require an analysis be conducted but have specifically specified the minimum elements which must be evaluated. Maryland, for example, has provided:

⁸² Federal Public Transportation Act of 1982, § 308, 96 Stat. 2140, 2151 (1983).

DECIDING TO USE

(b) The life-cycle costs shall be the sum of:

(1) The reasonably expected fuel costs over the life of the building, as determined by the Department, that are required to maintain illumination, power, temperature, humidity, ventilation, and all other energy-consuming equipment in a building; and

(2) The reasonable costs of probable maintenance, including labor and materials, and the operation of the building.⁸³

Such language gives clear direction on the nature of the analysis to be conducted. However, unless the use of the analysis results are mandated, the executive agency may be free to purchase a building with cheaper initial cost and yet a higher total cost to the government.⁸⁴ The statute must combine both minimum life cycle costing factors and a clear direction requiring their use or procuring agency discretion remains effectively unfettered. Among state energy statutes only North Carolina has taken the process to this stage, requiring:

(g) Selection of the optimum system or combination of systems to be incorporated into the design of the major facility shall be based

⁸³ Md. Ann. Code Art. 78A, § 25E (1980). See also N.C. Gen. Stat. § 143-64.12 (1978); Fla. Stat. Ann. § 255.255 (West 1975).

⁸⁴ Md. Ann. Code Art. 78A, § 25A (1980) requires only that "a life-cycle cost and energy consumption analysis shall be considered during the preliminary design of new buildings." Only slightly better is the language of Fla. Stat. § 255.254(1) (West 1975) requiring that life-cycle costs "be a primary consideration in the selection of a building design."

DECIDING TO USE

on the life-cycle cost analysis over the economic life of the facility.⁸⁵

At least one state legislature has required the use of life cycle costing in the contract award process and has specified the types of expenses which will be considered in the life cycle cost analysis. A Washington state statute providing for purchase of ferry vessels based upon competitive design proposals required contract award based upon price and "the operation and maintenance costs of each firm's vessel design...."⁸⁶ This type of statutory language precludes an argument by unsuccessful bidders that more remote life cycle cost factors should have been considered and yet could form the basis for judicial review if the procuring agency fails to include a significant operating or maintenance cost on which the unsuccessful bidder's product excelled. By specifying the factors to be considered, albeit in a general manner, the statute placed bidders on sufficient notice of the award criteria and allowed the procuring agencies evaluation scheme to withstand judicial scrutiny.⁸⁷

⁸⁵ N.C. Gen. Stat. § 143-64.12 (1978).

⁸⁶ Wash. Rev. Code Ann. § 47.60.670 (repealed 1980). It is unclear whether the repeal of the section was due to problems with the LCC provisions or a more controversial provision dealing with an evaluation bias for in-state producers.

⁸⁷ *Equitable Shipyards, Inc. v. Department of Transportation*, 93 Wash. 2d 465, 611 P.2d 396 (1980).

DECIDING TO USE

Of course, by dictating that a life cycle cost analysis be the basis for the evaluation of design alternatives and that specified elements be considered in that analysis the procuring agency retains little or no discretion in the procurement and is left to merely conduct and quantify the life cycle cost analysis. Given that the life of a new building, ship or other long-lived asset may be 30 or more years it is conceivable that the design with the lowest life cycle costs may have an initial cost several times that of a design with the lowest initial cost but high use and maintenance costs. As all government bodies must operate within a budget such a determination might preclude any purchase under a given procurement due to the prohibitive initial cost of the lower life cycle cost design.⁸⁸ Such budgetary considerations are "wildcards" which cannot analytically be factored into the life cycle cost equations but rather represent a ceiling restraint on the viability of any particular life cycle cost analysis. The existence of such factors, however, is undoubtedly one of the principle reasons Congress and state legislatures have shown reluctance to mandate specific life cycle costing factors or to require evaluations based completely and strictly on life

⁸⁸ Such a problem could easily arise if agencies were required to evaluate lease/buy alternatives and were precluded from leasing if buying would be more cost effective over the life of the item. See e.g. Kaman Aerospace Corporation, Comp. Gen. Dec. B-209220, 83-1 CPD § 667 (1983).

DECIDING TO USE

cycle costs. Although the number of statutes directing "consideration" of life cycle costs is likely to grow it appears unlikely that the use of life cycle costing will be a statutorily required evaluation tool for significant numbers of procurements in the near future.

2. Regulations

Although more prevalent than statutory pronouncements, regulatory provisions regarding the use of life cycle costing are not common. As creatures of the executive branch and its many components, regulations suffer less from the need to balance flexibility and direction. First regulations are promulgated at a level and in a manner allowing for greater ease of modification and can more easily be waived by the appropriate authority when necessary. Second the issuing authority is invariably closer to the procurement process than Congress and in a better position to evaluate the administrative impact new requirements will have on that process. Lastly as an organization directly responsible for the procurement activity being effected, the issuing agency is in a better position to balance the pros and cons of the policy established by a new requirement. Despite these benefits procurement regulations have thus far failed to mandate significant life cycle cost analysis in the contract award process.

DECIDING TO USE

The Department of Defense (DOD) Supplement to the FAR provides the following policy guidance regarding the use of life cycle costs:

Since the cost of operating and supporting a system or equipment over its useful life is substantial and, in many cases, greater than the acquisition costs, it is essential that such costs be considered in development and acquisition decisions in order that proper consideration can be given to those systems or equipments that will result in the lowest life-cycle cost to the Government.⁸⁹

The identical language was formerly contained in the Defense Acquisition Regulation (DAR)⁹⁰ and the assertion that that regulation required the evaluation of life cycle costs in DOD procurements has been rejected by both the Comptroller General⁹¹ and the United States Claims Court.⁹²

The failure of the FAR and DOD FAR Supplement to dictate the consideration of post-acquisition costs in contract award evaluations indicates that life cycle costing has not achieved a position where it is considered desirable for broad, indiscriminate application to government contracts. There are, however, specific applications where the use of life cycle costing is addressed by regulation.

⁸⁹ DOD FAR Supplement § 7.103(f)(2)(i) (1984).

⁹⁰ DAR § 1-335 (1980).

⁹¹ Big Bud Tractors, Inc., Comp. Gen. Dec. B-209858, 83-1 CPD § 127 (1983).

⁹² Big Bud Tractors, Inc. v. United States, 2 Cl. Ct. 188, 1 FPD § 88 (1983).

DECIDING TO USE

The majority of these regulations merely note the advisability of taking into account life cycle costs in awarding certain types of contracts and their consideration is purely elective.⁹³

The regulation requiring the most extensive use of life cycle costing is undoubtedly FAR § 14.407-5(a) which provides:

If bids are on an f.o.b. origin basis ... transportation costs to the designated points shall be considered in determining the lowest cost to the Government.

As noted earlier, adjusting bids for transportation costs won early acceptance. In fact, such adjustments have been required as evaluation factors for at least 16 years and have been specifically sanctioned by the Comptroller General.⁹⁴ In general, transportation costs are susceptible of reduction to dollar amounts with reasonable certainty and without undue difficulty. Further such costs will have impact on virtually all federal supply procurements, ensuring that the potential cost savings are significant. These factors are present to lesser degrees in most other life cycle cost factors, and the current acceptance of the use of transportation costs as an award evaluation factor is

⁹³ See e.g., 41 C.F.R. § 29-70.216-9(b)(2)(iv) (1983) (Department of Labor); 7 C.F.R. § 226.22(i)(2)(ii)(D) (1984) (Department of Agriculture).

⁹⁴ See Comp. Gen. Dec. B-163294, March 27, 1968, Unpub.

DECIDING TO USE

indicative of the ability of regulations to successfully integrate more life cycle costing into federal procurement.

The increase in regulations requiring life cycle cost award evaluations however, seems unduly slow. A Department of Housing and Urban Development regulation appears to be the first, and to date the only, published regulation requiring the use of life cycle costs, other than transportation expenses, in the evaluation process. This regulation provides that state public health administrators who receive grants from the federal government for the purchase of large appliances:

shall acquire only ... electric refrigerators, cooking ranges and domestic hot water heaters which are of the highest efficiency offered by a manufacturer for the type and size required, unless a life-cycle cost analysis determines that the less efficient model is more economical over the life of the appliance.⁹⁵

It is unclear whether the provision applies only to evaluation within each manufacturer's line of appliances or to all appliances offered. The former interpretation would allow a solicitation in which a manufacturer could be penalized for having a higher priced but more efficient appliance in his line, for it would require a "price only" evaluation between that higher priced item and the less expensive, less efficient model offered by a producer who makes no "efficiency" model.

⁹⁵ 24 C.F.R. § 865.308 (1982).

DECIDING TO USE

The second interpretation appears the logical choice. Thus the agency would be required to award to the most efficient appliance offered by any offeror or bidder unless the life cycle cost analysis determined that a less efficient appliance offered would be less costly over the life of the item. This approach requires a life cycle cost analysis and mandates award be made based directly upon that analysis. It should be noted that this particular procurement is well suited for such a mandatory life cycle cost analysis. As a result of the federal law requiring the development of utility consumption estimates for consumer appliances⁹⁶ there exists objective comparison data to apply in the evaluation, the lifetime utility cost is usually several times the initial cost of an appliance, and is probably the only significant post-acquisition cost which would warrant life cycle evaluation.

3. The Future

To date legislation and regulations have not significantly reduced the contracting officer's discretion to use or not to use life cycle costs in his award evaluation. However, the need to consider post-acquisition costs in making contract decisions has been repeatedly

⁹⁶ See 42 U.S.C. § 6302 (1982).

DECIDING TO USE

emphasized.⁹⁷ The reluctance to utilize a full life cycle cost analysis in making award decisions is fostered by a lack of high level guidance. More specific statutory or regulatory requirements are badly needed in the LCC area. However, any new regulations and statutes which require life cycle costing need to provide at least some guidance for its application. Statutes or regulations which provide only directions to use LCC without such guidance may create serious uncertainty among contracting officers. At best, they provide disappointed bidders a ready basis for protest;⁹⁸ and at worst, can require the evaluation of criteria in cases where its use is impractical.⁹⁹

Draftpersons should specify either specific types of life cycle costs which must be evaluated (e.g. fuel costs) or should specify the magnitude of the factors to be covered (e.g. all post acquisition costs [or credits] estimated to exceed the greater of 25% of the initial cost of the initial

⁹⁷ See Report of the Commission on Government Procurement, Volume 3, Chapter 6, Commission on Government Procurement, Washington D.C. (1972).

⁹⁸ See e.g. Lanier Business Products, Inc., Comp. Gen. Dec. B-200695, 60 Comp Gen. 306, 81-1 CPD § 188, aff'd on reconsideration ex rel. Dictaphone Corporation, 81-2 CPD § 511 (1981).

⁹⁹ In construing a contract clause the Comptroller General has held that indicating that life cycle costs will be used without specifying areas of application or other guidelines requires the evaluation of "all determinable factors." Southwestern Bell Telephone Co., Comp. Gen. Dec. B-200523.3, 82-1 CPD § 203 (1982) discussed at notes 151-54 and accompanying text, infra.

DECIDING TO USE

procurement price or \$10,000). Contracting officers should be specifically left free to include other factors if considered desirable.

B. SITUATIONS REQUIRING LIFE CYCLE COST ANALYSIS

Although not required by statute or regulation practical considerations dictate the use of a life cycle cost analysis in certain situations. Such situations occur when various bids or proposals provide for accomplishing the government's procurement goal but differ in the rights the government obtains or obligations it assumes incident to reaching that goal.

The essence of life cycle costing is the reduction of various alternatives to a common denominator, their life cost. It can be argued that any time two products which compete for a procurement selection have significantly different characteristics direct head to head comparison is impossible. However for many years the government has operated advertised procurement under the theory that it will specify its minimum needs in a solicitation and purchase the product with the lowest cost which complies with the specifications of that solicitation. Thus a system of price to price comparison has been widely practiced without regard to post acquisition costs, or differences in product attributes. The fact that one product is only

DECIDING TO USE

slightly higher in price and vastly superior in performance or quality is ignored in this process.¹⁰⁰ Although this method of operation is often cost ineffective and has been criticized¹⁰¹ it is a long standing practice. Thus the fact that two products, each of which meet the government's specifications and perform equivalently, have significant or even extreme differences in post-acquisition costs cannot be said to make the use of life cycle costs a necessity. In fact, such procurement situations are evaluated and awards made on a daily basis without the slightest consideration of the full or eventual cost to the government of the item being purchased. Nevertheless, there remain several situations where life cycle costing provides not only the wiser method of evaluation, but in fact the only viable approach.

A price-only evaluation generally fails when one or more of the alternatives to be consider involves the acquisition of something which encompasses a totally different approach to accomplishing the desired objective of a procurement. But a differing approach alone is not sufficient. Consider a government requirement to construct flood controls on a particular river. Although one bidder offers a dam upstream and another proposes to build

¹⁰⁰See e.g. Comp. Gen. Dec. B-168046, June 14, 1970, Unpub.

¹⁰¹See e.g. Chapter 6, Report of the Commission on Government Procurement, Volume 3, Commission on Government Procurement, Washington, D.C. (1972).

DECIDING TO USE

permanent dikes and levees, they can be compared directly on the basis of price. To require a life cycle cost analysis the differing approach must involve not physical variation but a variation in the obligations of the government toward accomplishment of the procurement goal. Suppose, for example, the government desires to obtain fresh fruit for the dining hall at a remote military facility. It solicits bids to provide 5000 pieces of fresh fruit per week for a year. Bids are expected to be quite high because of the great transportation expense of weekly trips to the facility. Although the "shelf life", weight and consumer acceptance of various types of fruit may vary considerably the government can compare apples and oranges on a price per piece basis to obtain the overall price of each bid. One bidder, however, indicates he desires to construct a green house and provide fruit trees sufficient to supply the needed fruit. His bid is half that of the next lowest. The problem comes in that government employees will have to care for the trees and government utilities, water year round and heat in the winter, will be consumed. Assuming this innovative approach is acceptable, which is cheaper? Compared on the basis of price alone the bidder offering trees wins easily. However, in practice this method could prove many times more costly to the government. Only by including as evaluation factors the cost of labor and utilities to be expended over the coming year, a life cycle

DECIDING TO USE

cost analysis, can the bid supplying trees be fairly evaluated against the others.

The extreme example of this problem involves the comparison of performing a task with in-house resources or obtaining the service or end product through contract channels. There is no "price" (in the procurement sense) at all for in-house work forces. They are not paid on a per job basis and the numerous costs associated with their use can be quantified only with considerable difficulty and the use of numerous approximations and predictions. In fixed price contracts the government obtains, through the bidding process, an exact cost¹⁰² of the job and need bear none of the uncertainty involved in a commercial endeavor. If a service is involved the use of life cycle costs are directed to the work performed and not the product, if any, actually produced. However, the analysis and requirements for the process remain the same. The idea is to develop a dollar figure which represents the total cost to the government of using in-house forces to accomplish the task desired. Opportunity costs obviously play a large part in this process, but other factors such as physical plant, tooling and training may also play significant roles. In those procurements where in-house forces are required to "bid"

¹⁰²Or if one wishes to consider the costs of contract administration, at least a very close approximation of the final cost.

DECIDING TO USE

against contractors¹⁰³ the use of life-cycle costing is essential, at least for the evaluation of the in-house costs.¹⁰⁴ Life cycle costing may also be essential where the solicitation allows or requires bidders to price several methods of performance some of which are based upon the use of government property.¹⁰⁵

The other major area in which a life cycle evaluation is essential also involves different methods of obtaining the desired product. However, in such cases it is not additional government responsibilities that are of concern but the form of ownership which the government needs or desires when physical property is to be acquired. Principally this involves an evaluation of the benefits of leasing the property as opposed to purchasing it. As noted earlier one datum needed to effectively utilize life cycle costing is a reasonable estimate of the life of the property needed. This life is not necessarily the full period of time which the property is expected to be serviceable, but may be the time period during which the property will be needed or useful, if that period is less than the service life. Thus it might seem reasonable to compare a leasing

¹⁰³"Performance of Commercial Activities", Office of Management and Budget Circular A-76, August 16, 1983, 48 F.R. 37110.

¹⁰⁴See ARA Services, Inc., Comp. Gen. Dec. B-211710, 84-1 CPD § 93 (1984).

¹⁰⁵See e.g. MAC Services, Ltd., Comp. Gen. Dec. B-203818, 82-1 CPD § 46 (1982).

DECIDING TO USE

option with a purchase plan by simply comparing the lease costs over the useful life against the purchase price. In fact this means of comparison would work reasonably well on certain items with short useful lives, and is in and of itself a simplistic form of life cycle costing. There are, however, at least three primary difficulties with this basis of comparison.

First, the method fails to take into account the time value of money. Leasing cost are generally spread fairly evenly over the life of the lease. Purchase almost always involves full payment at the time of the sale or shortly thereafter. Thus the comparison method under discussion will always favor the purchase plan by failing to adjust all costs to present dollars and thereby overestimating the actual cost of the lease plan.

Second, it fails to account for the salvage value of purchased property if used until the end of its service life, or residual (resale) value, if the period of time for which it is needed will be less than the item's service life. This concept also encompasses disposal costs in cases where the cost of getting rid of an item actually exceeds its final value.¹⁰⁶

¹⁰⁶See e.g., Roan Corporation, Comp. Gen. Dec. B-211228, 84-1 CPD § 116 (1984).

DECIDING TO USE

Third, most lease plans provide that the government will be relieved of some of the post-acquisition costs of ownership, generally all or some of the maintenance, servicing or repair costs. Therefore, to compare a lease plan which provides such downstream savings, with a "straight" purchase method requires an estimation of the included costs so that they may be added, after adjustment to present dollars, to the cost of the purchase plan. In keeping with the desirability of maintaining as many options as possible the practice of requiring bidders to offer both lease and purchase bids where either method might prove most advantageous should be expanded. In addition the type and number of options may also be increased. Where appropriate to the item involved, a straight month to month rental and lease with purchase option should be considered along with long term leases and purchase plans. In some cases all four options have be included in a solicitation.¹⁰⁷

The General Services Administration (GSA) has recognized the need for a life cycle cost analysis in making this "method of ownership" determination. GSA regulations applicable to the acquisition of telecommunications equipment government-wide provides:

The method of contracting for telecommunications requirements shall be determined after

¹⁰⁷Interscience Systems, Inc., Comp. Gen. Dec. B-199918.2, 81-1 CPD § 222 (1981).

DECIDING TO USE

consideration of the relative merits of the alternative methods available, i.e. purchase, lease or lease-with-option-to-purchase. A comparative cost analysis¹⁰⁸ of the alternative methods shall be performed to determine which method provides the Government with the lowest overall cost over the total system life.¹⁰⁹

C. DESIRABLE USES OF LIFE CYCLE COSTING

The line between situations where life cycle costing is required and where it is only desirable is not a bright one. In those cases where post acquisition costs are great, especially where they can be expected to exceed purchase costs, the failure to use life cycle costs may create such uncertainty regarding the most advantageous bid or proposal that its use may be said to be required by sound procurement judgement. The Comptroller General has often disapproved procurement methods which create substantial doubt as to whether award has or will be made to the lowest bidder,¹¹⁰ however, the policy consideration upon which these disapprovals are based has never been applied to require life cycle cost consideration regardless of the magnitude of

¹⁰⁸Comparative cost analysis is defined as "a procedure for adjusting the system life cost to present value of money." Telecommunications Acquisitions, Federal Procurement Regulation Temporary Regulation 51, § 1-4.1301-5, reprinted at the end of Title 42 of the CFR.

¹⁰⁹Id. at § 1-4.1203(a).

¹¹⁰See, e.g., 44 Comp. Gen. 392 (1965).

DECIDING TO USE

the ultimate additional cost to the government.¹¹¹ Thus, unless required by statute or regulation or the procurement involves one of the "mandatory" situations discussed in the prior section, the evaluation of the procurement on price alone is a viable alternative. It then becomes necessary to examine a number of factors which will determine the advisability of including life cycle cost factors in the evaluation process.

As noted earlier a life cycle cost analysis envisions consideration of all significant life cycle cost factors which can be anticipated. In practice this is not generally practical and it will seldom be possible to achieve award evaluation based on a "true" or total life cycle cost analysis. The inability to include one or more factors should not, however, lead to abandonment of other factors which are capable of reduction to practical operation. As noted in Department of Defense guidance:

any LCC element should be used in any procurement where that element is applicable and feasible. It is better to apply only a few (or even only one) LCC elements than to apply none.¹¹²

¹¹¹See e.g., 35 Comp. Gen. 282 (1955) where the GAO upheld the failure of the procuring agency to consider additional administrative expenses estimated at 3 to 10 thousand dollars which would be incurred upon award to the low bidder but would be avoided by an award to the protestor whose bid was only \$417 higher.

¹¹²DOD Publication LCC-1, "Life Cycle Costing Procurement Guide (Interim)", Department of Defense, Washington, D.C., July 1970 at para. 1-6 (emphasis added).

DECIDING TO USE

The validity of this approach is irrefutable. If the procurement price of an item is estimated to be 50 percent of its final life cycle cost and contract award is based solely on price then half the potential cost variance between bids has been ignored.¹¹³ If but one LCC cost constituting any significant part of the total life costs is also evaluated this variable falls proportionally.

As DOD has noted the use of life cycle cost elements should be limited to those which are "applicable and feasible." The remainder of this chapter discusses when a particular post-acquisition cost is "applicable" to a given procurement's award evaluation procedure. That is, whether use of that cost in determining the bidder to whom award will be made will result in a more cost effective procurement. The next chapter deals with determining whether an "applicable" cost factor can "feasibly" be included in the evaluation process.

1. Consideration of the Item to be Procured

As might be supposed the nature of the item being procured is the most important factor in determining the need for a life cycle cost analysis. However, such

¹¹³In fact 50 percent is low for many items. Operating and support costs alone on modern aircraft have been estimated to exceed 180 percent of the initial price. Emmelhainz, "Innovative contractual approaches to controlling life cycle costs", Defense Management Journal, Vol. 19, No. 2, 1983, at 36.

DECIDING TO USE

considerations are primarily exclusion factors. That is to say that the nature of the item to be procured will seldom, by itself, dictate a life cycle cost analysis but it may, standing alone, negate the usefulness of such an analysis. The primary concern is the degree to which any item, satisfying the procurement need, can be expected to vary among the products offered by prospective bidders. As noted in a recent guide for state procurement practices initial price alone is a completely adequate criteria on which to make award of a contract for items that are "standard to the extent that differences in quality and performance for the intended use are negligible, as with many building materials and inspection-graded foodstuffs."¹¹⁴ The most obvious example of this would be a situation where a single product is suitable.

a. Single Suitable Item

Price alone will be a sufficient test of economy when the needs of the government can be satisfied only by a particular item or product. Except for unique items, such as collectibles (e.g. a Gutenberg bible) such situations are rare. One example might be the government's purchase of gold and silver as currency supports. Being elements of nature every ounce of gold is the same as every other

¹¹⁴State and Local Government Purchasing, The Council of State Governments, Lexington, Ky., 1983, at 41.

DECIDING TO USE

ounce.¹¹⁵ This is, of course, no more than a restatement of one of the primary "laws" of life cycle costing, there must be viable alternatives for the analysis to be of any benefit.

b. Available Items have Similar Post-acquisition Costs

Where the articles offered by bidders can be expected to vary but will be economically fungible a similar result obtains. The term "economically fungible" is quite distinct from any consideration of an item's acceptability for the accomplishment of the procurement purpose. The specifications are expected to limit the items which may be offered in a bid to those which will accomplish the desired purpose. Rather this concept implies that the post acquisition costs of all items will be identical or that any differences will be negligible in comparison to the procurement costs of the item.

Conceptually the simplest situation to fit this condition would be items which have no post acquisition costs at all. However, items which are procured are generally intended for some type of use and few items may be used without cost. Even such simplistic items as the common paper clip can have significant variants in post acquisition costs in such factors as the time involved to use them,

¹¹⁵Even if various offers contain differing amounts of impurities they can be evaluated based upon their actual gold content and priced accordingly.

DECIDING TO USE

their effectiveness in holding paper or reusability. Nonetheless, items which are consumed immediately upon delivery sometimes fit this category. Thus in a contract to provide ice for cooling foodstuffs at a temporary field kitchen offers to provide normal ice or "dry" ice may be evaluated strictly on the basis of price.¹¹⁶

More numerous, but by no means as extensive as is often believed, is the category of items which have negligible differences in post acquisition costs. In making this determination it is necessary to identify the significant elements of post acquisition costs and the nature of variations which may be expected in the offered products. This step must generally be made quite subjectively. The type of ownership costs which will result from the procurement are often known only by broad category and which of them will prove significant depends on experience with the item or a similar product, all too often unavailable information.

For example, the use of polyvinyl chloride (PVC) rather than steel pipe in below ground piping became common in the late 60s and early 70s. PVC was estimated to require a similar maintenance and repair schedule, except for repairs

¹¹⁶"Dry" ice has a much higher cooling coefficient thus the price comparison must be based upon the total cooling requirement (expressed in BTUs or similar terms) of the contract and not by weight or volume. However, award is still being based solely on the basis of initial cost.

DECIDING TO USE

due to corrosion, where PVC was expected to be far superior. PVC was costed on this basis and often selected for use as providing the least expense total life cost despite its higher initial price. Experience proved, however, PVC, being weaker than steel, was much more susceptible to breakage due to ground settling and in arid areas PVC water systems were often holed by gnawing prairie dogs and other burrowing animals. PVC repair costs in such areas were three times that of similar steel systems.¹¹⁷

The ability to forecast post-acquisition costs, although often difficult, is a crucial aspect of this and other considerations discussed below. Life cycle costing should not be rejected under this subsection unless experience has shown that items meeting the needs of the government have invariably exhibited similar post acquisition costs and that it is unlikely that technological advances will produce products giving a different result on the current procurement.

c. Item maturity

The procurement of new and untried products present two difficulties to the use of life cycle costing. First, as demonstrated in the example above, the ability to forecast the post acquisition expenses of such products is generally

¹¹⁷Example based on the author's experience as a corrosion engineer in Tucson, Arizona.

DECIDING TO USE

poor. Second the cost of initial construction (i.e. the price) of the item is seldom capable of accurate estimation.

Unlike many businesses the government is frequently in the market for sophisticated items, often weapons, which require the application of techniques on the "cutting edge" of technology. The nature and requirements of contracts to produce such items are often difficult or impossible to estimate with any reasonable accuracy. The level of effort to produce a new item, its characteristics and the cost of production are all unknowns. It is not surprising that the operating, maintenance and other post acquisition costs, coming further downstream in the procurement process, will frequently be as uncertain and in many cases even more a matter of guess work. The purpose of life cycle costing is to improve the chances that the item selected for award will serve the intended purpose at the least ultimate cost to the government. When the data available to enter in life cycle costing equations is highly uncertain the result of using a life cycle cost analysis in the contract award evaluation may result in greater, not less uncertainty as to the wisdom of a particular selection.¹¹⁸ The Department of Defense guidance of the use of life cycle cost in major weapons acquisition notes:

¹¹⁸A detailed discussion of this phenomenon is made in Chapter III. See pages 139-40, *infra*.

DECIDING TO USE

Generally, the earliest use of LCC in source selection decision-making will be after the Validation Phase has been complete. It is not likely that LCC will be a serious consideration in source selection prior to that time because usually it cannot be estimated with sufficient confidence to be reliable and equitable for differentiating among bidders.¹¹⁹

The validation phase is the point at which the design of the item can be evaluated (with reasonable confidence) to ensure it will meet the needs of the government.

Contracts for the development or development and production of these "new technology" items are most often awarded on the basis of cost reimbursement contracts. In fact, the uncertainty which negates the value of life cycle costing in a given procurement may also be the basis for selecting a cost reimbursement contract to obtain the needed item.

[The key element in the determination to use a cost reimbursement contract is the inability of the procuring agency to describe the work with a sufficient degree of accuracy to permit the use of a fix price contract.¹²⁰

Thus, the decision to obtain an item with a cost reimbursement contract often is a good sign that life cycle

¹¹⁹DOD Publication LCC-3, "Life Cycle Costing Guide For System Acquisitions (Interim), Department of Defense, Washington, D.C., January, 1973, at paragraph 4.6.

¹²⁰R.C. Nash, Jr. & J. Cibinic, Jr., Federal Procurement Law, Volume 1, The George Washington University, Washington, D.C., 1977, at 432.

DECIDING TO USE

costing will not be effective in evaluating the offers. The analogy is, however, far from perfect. The nature of a given item may preclude a reasonable estimate of its final form or cost of production but may allow accurate estimates of at least some significant post acquisition costs. Thus in a competitive procurement for an advanced aircraft the preliminary designs may provide overall airframe dimensions which are not expected to change significantly over the plane's subsequent development. If the design of some offerors will easily fit into existing hangars available at most air bases while the designs offered by others will obviously require the construction of numerous new structures it seems appropriate to consider this factor in making award. Likewise a design which will utilize an engine already incorporated in other aircraft within the armed services' inventory will undoubtedly result in significant reduction in spare parts inventories, service personnel training costs and related expenses. Subjective analysis indicate that the magnitude of these factors will be significant, regardless of the uncertainty with which their ultimate magnitude may now be projected. Even in cases where analysis indicates a current inability to estimate any significant post acquisition costs consideration should be given to the benefits of letting a design contract without life cycle cost factors. A subsequent production contract in which the life cycle costs of the now

DECIDING TO USE

validated design would be considered in the award process could then be utilized. Another alternative worth considering is inclusion as part of the development contract clauses requiring these factors be considered in the design itself.¹²¹

2. Procurement considerations

Unlike the considerations which turn upon the nature of the item itself, a number of factors must be considered which are linked to the procurement process itself and the marketplace in which it operates. When considering the "item" factors the contracting officer should continue the consideration of life cycle costing unless the item was one of the rare types discussed. The factors discussed in this subsection involve "positive" requirements for life cycle costing to be found to be of benefit. That is to say that unless these factors are present life cycle costing will not generally be feasible.

a. Competitive alternatives

Life cycle costing works only to aid in the selection of one of several alternatives. Economic and legal constraints often result in a severe limitation on the sources from which the government can obtain a desired item

¹²¹For a discussion of this concept, called Design to Life Cycle Costs see Emmelhainz, "Innovative contractual approaches to controlling life cycle costs", Defense Management Journal, Vol. 19, No. 2, 1983.

DECIDING TO USE

or service. Untold centuries of human activity have demonstrated that if one person or concern can create an item others are capable of the same accomplishment. Thus this limitation cannot be said to be directly dependent upon the nature of the item itself, although certain types of property more often fall into this category. Where only a single viable alternative to any business decision exists, life cycle costing is of no value. Admittedly there are always alternatives. The most common being the decision to do nothing. However, the concept of a "viable alternative" is one that is based on a reasonable economic action. If a \$15 million aircraft is grounded due to lack of a \$100 part there is no viable alternative to acquiring that part. If the part is proprietary to a given manufacturer the government may have no alternative but to obtain it through sole source procurement. There is no alternative to be compared to such an offer and no use for life cycle costing in making the award decision. This does not negate the benefits of life cycle costing for such purposes as determining the most economical number of parts to obtain in a given buy, but it generally does preclude the use of life cycle costs in an award determination process.

Thus the decision that a sole source procurement is necessary will almost always negate the need to further consider the use of life cycle costing. A very limited exception might exist in those cases where the supplier

DECIDING TO USE

offers various grades of the needed item, different forms of ownership options or several warranties or product servicing options. In such cases it may still be advantageous to evaluate life cycle costs to determine the least expensive of the alternatives offered.

b. Performance Specifications

Unless the needs of the government can be specified in terms of function or performance, life cycle costing is unlikely to be of use in bid or offer evaluation. When the specifications of a solicitation specify the criteria of a conforming item to the extent that any product offered under a responsive bid must be essentially identical with every other such product all alternative items will have identical post-acquisition costs.

Initial price is most likely to represent ultimate economy ... when the specifications call for a product or service produced and delivered to the purchaser's precise design, as in the case of a construction item, or custom-tailored uniforms.¹²²

This situation is distinguished from its "item consideration" equivalent because the relevant factor is not actually a limitation on the existence of conforming items, but on the ability of the procuring agency to draft performance specifications which allow sufficient variation for products

¹²²State and Local Government Purchasing, The Council of State Governments, Lexington, Ky., 1983, at 41.

DECIDING TO USE

with significant life cycle cost differences to compete while assuring the minimum needs of the government are met.

Design specifications tell the contractor how to perform work which will conform to a solicitation. To the extent that an item being procured is made by conforming to such specifications there is no room for the product variance necessary to yield significant differences in life cycle costs between competing products. Such specifications preclude meaningful alternatives in the areas of the work to which they apply. Performance specifications prescribe what a conforming product must be capable of doing. Performance specs may be divided into two categories, product-oriented and needs-oriented.¹²³ A product-oriented specification indicates the basic type of product which the government wishes to procure (e.g. aircraft, automobile) while leaving the method of achieving the desired performance, speed, capacity etc., to the contractor. A needs-oriented, or functional, specification describes "the work to be performed in terms of the end purpose to be accomplished, not the way in which the work is to be performed."¹²⁴ An early draft of the FAR defined "functional specification" as:

¹²³See generally "Specifications", Government Contracts Monograph #13, Ronald G. Schumann, The George Washington University, Washington, D.C., 1980 at 5.

¹²⁴Id. at 6.

DECIDING TO USE

a description of a product in terms of its performance characteristics and intended use. It may include a statement of the qualitative nature of the product and, when necessary, will contain those minimum essential characteristics to which the product must conform in order to satisfy its intended use.¹²⁵

Thus, both the type and method of performing the needed objective are left to the ingenuity of the bidders. Because they allow a greater range of products to conform to the specification functional specifications offer the greatest opportunity for the use of life cycle costs. Due to the potential need to evaluate products of vastly differing origin, composition and method of operation the need for life cycle cost analysis is also greatest where functional specification are used. Functional specifications also allow greater competition among available products and, where feasible, their use is the preferred mode of procurement.¹²⁶

The inability to define the needs of the government in terms of performance rather than design is a common occurrence in federal procurement. This situation is commonly encountered in the "brand name or equal" specification. The government recognizes that a given

¹²⁵1983 Draft FAR § 10.001. The FAR as actually issued fails to define "functional specification."

¹²⁶See e.g. Telecommunications Acquisition, FPR Temp. Reg. 51, supra at § 1-4.1202-2(a)(3).

DECIDING TO USE

product will meet its needs. It either knows of no similar products or is incapable, due to time or economic considerations, of preparing performance specifications which will sufficiently describe the needed item. To the extent that performance specifications cannot be prepared describing what is required, it is most unlikely that the procuring agency can anticipate potential variances in conforming products such that life cycle cost factors could be included in the solicitation.¹²⁷

This particular criteria can best be evaluated by asking the question:

Is the item covered by performance specifications or can minimum performance parameters be specified and verified?¹²⁸

It is not sufficient for a performance specification to be draftable, it must also be verifiable. Thus it may be

¹²⁷Note however, that the Comptroller General requires "brand name or equal" specifications to include a listing of the essential features, the so-called salient characteristics, which the brand name item possesses. 41 Comp. Gen. 242 (1961). To the extent that the procuring agency can establish such a list in the form of performance necessities, it may also be able to predict which of the remaining characteristics of the named product could vary among "equals" and which of these could result in significant post-acquisition cost variations. The ability to make such a determination has, however, been stated to be a good indication that the "brand name or equal" clause was unnecessary and unjustified. See 50 Comp. Gen. 193 (1970).

¹²⁸DOD Publication LCC-1, "Life Cycle Costing Procurement Guide (Interim)", Department of Defense, Washington, D.C., July 1970 at figure 2-1 (emphasis added).

DECIDING TO USE

possible to draft a performance specification calling for a shelf life of 20 years, however if no test short of the passage of twenty years is adequate to test the factor the contracting officer may feel constrained to specify a design which has demonstrated adequate shelf life through past performance.

Of course many procurements can be expected to have a combination of performance and design specifications. The presence of a number, or even a majority, of design specifications need not preclude the benefit of life cycle costing if these specifications leave room for product variance in some areas effecting post acquisition costs. However, the greater the number of performance, particularly functional, specifications and the fewer design specs, the greater the potential benefit of using a life cycle cost analysis in the evaluation of bids or offers. Consideration should, however, be given to eliminating any LCC factor solely or predominately effected by tight design specifications, even if performance specs dominate other areas of the procurement. For example in a solicitation for a circuit board to enhance the capability of existing government computer equipment the enhancement goals may be primarily based upon functional specifications. The requirements for connection to the existing equipment may, however, require the board be equipped with five wire connectors for soldering to five specified locations in the

DECIDING TO USE

existing computers. Such a specification precludes the need or benefit of evaluating installation costs because the government's costs of soldering five wires to given contacts will be the same for all boards conforming to the specifications.

The making of decisions regarding the use of life cycle costing and the type of specifications to be used in the procurements must be considered simultaneously. Operating and other post acquisition costs may indicate that life cycle cost considerations are important in a given procurement, however, experience and the nature of the procurement item may indicate only design specifications will ensure the product acquired will perform as required. In such a situation one of the two concepts must yield to the other. If performance specifications are impossible then the decision is easy. More often, however, the preparation of performance specifications, particularly functional specifications, is possible but will result in greater uncertainty as to the actual ability of a conforming item to meet all potential needs of the government.

If design specifications are already available the preparation of functional specifications may involve a delay and the expenditure of significant sums. If the use of such specifications is solely to facilitate the inclusion of life cycle costs in the evaluation process then the quantitative

DECIDING TO USE

benefits of life cycle costing must be weighed against the potential costs, both in time and money, of developing and using functional or other performance specs.

As with the other factors discussed only a subjective decision is desirable at this stage. More detailed, and quantitative consideration will come with the solicitation preparation phase of the procurement process.

D. DEFENDING THE DECISION TO USE OR NOT USE LIFE CYCLE COSTS

Although early decisions were often hostile to the use of life cycle cost criteria¹²⁹ more recent decisions of the Comptroller General appear to grant the broadest discretion to an executive agency's decision to include or not to include life cycle cost criteria in the evaluation of bids and proposals.¹³⁰ Nevertheless prior to making the life cycle costing "go/no go" decision the contracting officer may be concerned with potential contractor challenges to that decision.

Bidders who have alleged that an agency abused its discretion in not including specific life cycle cost

¹²⁹See e.g., 25 Comp. Dec. 679 (1919)(delivery costs) and 33 Comp. Gen. 108 (1953)(resale value).

¹³⁰See e.g., Remington Rand Corporation, Comp. Gen. Dec. B-204084, 82-1 CPD ¶ 408 (1982).

DECIDING TO USE

factors have failed to prevail in a single case.¹³¹ In light of the Comptroller General expressed endorsement of properly formulated life cycle cost criteria¹³² few recent protests have attempted to challenge the inclusion of life cycle cost analysis in the solicitation's award criteria merely on the basis of the use of life cycle cost factors. Such a challenge must be made prior to the closing date and the only reported protest on this issue was held to be untimely and rejected without consideration.¹³³ The more numerous challenges complaining of contracting officer failure to include life cycle cost factors have also failed.¹³⁴ Again any protest regarding the absence of life cycle cost factors must be made prior to bid opening.¹³⁵

In supporting agencies' decisions on the use or non-use of life cycle costs the General Accounting Office has, if anything, shown an excess of deference. Cases have

¹³¹See Wild Heerbrugg Instruments, Inc., Comp. Gen. Dec. B-210092, 83-2 CPD § 295 (1983); System Development Corporation and International Business Machines, Comp. Gen. Dec. B-204672, 82-1 CPD § 218 (1982); 45 Comp. Gen. 59 (1965) and 43 Comp. Gen. 60 (1963). See also Burroughs Corporation, Comp. Gen. Dec. B-190222, 77-2 CPD § 422 (1977).

¹³²See Comp. Gen. Report B-178214, May 21, 1973.

¹³³American Laundry Machinery, Inc., Comp. Gen. Dec. B-196376, 80-1 CPD § 73 (1980).

¹³⁴See e.g., Wild Heerbrugg Instruments, Inc., Comp. Gen. Dec. B-210092, 83-2 CPD § 295 (1983); Cincinnati Bell Telephone Company, Comp. Gen. Dec. B-207177, 83-1 CPD § 41 (1983).

¹³⁵Trident Motors Inc., Comp. Gen. Dec. B-213458, 84-1 CPD § 142 (1984).

DECIDING TO USE

sanctioned the failure to include LCC factors despite reasonably clear statutory¹³⁶ and regulatory¹³⁷ requirements that they be included.

While the procedure and mechanics of evaluating life cycle costs in the award process has been subject to considerable GAO scrutiny¹³⁸ no recent decision has criticized or failed to uphold a contracting agency's decision to use or not to use life cycle costing. It appears likely that only a demonstrated lack of good faith or, in the case of a decision to use LCC, a showing that the factor had no cost impact on the procurement would induce the Comptroller General to overturn a contracting officer's decision in this area.

¹³⁶General Motors Corporation, Comp. Gen. Dec. B-206486, 82-1 CPD § 584 (1982).

¹³⁷Big Bud Tractors, Inc., Comp. Gen. Dec. B-209858, 83-1 CPD § 127 (1983). See also Xerox Corporation, Comp. Gen. Dec. B-180341, 74-1 CPD § 242 (1974) (failure to include residual value per OMB Circular 54).

¹³⁸See e.g., Eastman Kodak Company, Comp. Gen. Dec. B-194584, 79-2 CPD § 105 (1979) (procedure); American Telephone & Telegraph Co., Comp. Gen. Dec. B-200989, 81-2 CPD § 157 (1981) (substance).

CHAPTER III.

PREPARING A SOLICITATION WITH LCC FACTORS

Once the decision to use life cycle costs for the evaluation of bids or offers is made subjective analysis must give way to a more objective approach. In making the decision to use a life cycle cost analysis the contracting officer will have identified one or more LCC factors which appear worthy of consideration and for which data may be developed. This chapter deals with the steps necessary to achieve a solicitation which will allow, both legally and practically, the evaluation of these factors in such a way that the contract awarded will be more cost effective to the government than one based solely on price. The obvious starting point on this quest is the legal requirements for such a solicitation.

A. LEGAL REQUIREMENTS FOR LIFE CYCLE COST SOLICITATIONS

The statutory bases of government procurement are silent on the use or method of using life cycle costs. The FAR and other major regulatory authorities also fail to deal with this subject. As the use of life cycle costing has grown the Comptroller General has felt the need to at least partially fill this gap. Unfortunately the guidance which

PREPARING THE SOLICITATION

Comptroller General Decisions provide has not sprung from any organized effort to establish rules for the application of life cycle costing, but from case by case adjudications. As such there is significant uncertainty about the requirements discussed herein and there are areas where needed requirements have, as yet, failed to appear.

1. The Need for Solicitation LCC Provisions

In many cases it might be advisable to defer the decision on the use of life cycle costs as evaluation factors until after the closing date for the receipt of bids or offers. The contracting officer and his technical advisors could then consider the attributes of the various offered items and determine if there was likely to be sufficient differences between them to warrant use of the various potential life cycle cost factors. This option would be especially valuable where the costs of developing LCC data are high, require lengthy periods, or where an earlier expectation that a particular life cycle cost factor would be similar for all products offered proves erroneous. Unfortunately both policy and legal requirements do not allow the contracting officer this option. The policy constraint is explained in the Department of Defense's LCC guide on major systems acquisition:

A primary intent [in considering life cycle costs] is to cause LCC estimates to impact upon design/development decision-making by each

PREPARING THE SOLICITATION

bidder and contractor. To accomplish this intent each will have to be made fully aware, during the earliest development stages, of how the LCC of his design and system plan will be treated. He also will have to understand clearly that the LCC estimate will be a prime consideration in product evaluations, in source, selection, and program continuation.¹³⁹

In cases where commercial off-the-shelf type items are involved a similar need for advanced information to bidders exists to insure the widest possible bidder participation. Potential bidders with conforming items which they feel may be competitive only if life cycle costs are considered will often be disinclined to submit bids unless they are assured that their product's full benefits will be weighed.

For the protection of the procurement process itself the Comptroller General has long noted that:

if bids are to be evaluated on some basis in addition to price, those additional factors and the relative importance to be attached to each factor should be clearly stated in the invitation so that all bidders may be aware thereof in the preparation of their bids.¹⁴⁰

¹³⁹DOD Publication LCC-3, "Life Cycle Costing Guide For System Acquisitions (Interim)", Department of Defense, Washington, D.C., January 1973 at para. 1.3.

¹⁴⁰50 Comp. Gen. 447, 454 (1970). Note that the relative importance of "true" LCC factors is never an issue. The importance of such criteria is determined by its evaluated dollar value and not by some arbitrary point valuation.

PREPARING THE SOLICITATION

In Eastman Kodak Company¹⁴¹ this rationale was expressly applied to life cycle cost factors. The Comptroller General held that "bidders must have adequate notice that evaluation will be on [an LCC] basis".¹⁴² A number of protests have been sustained on the basis of the solicitation's failure to inform bidders of the nature and extent of life cycle cost factors to be considered in award determination.¹⁴³ Thus it is necessary to determine the extent to which life cycle costing will be used in the evaluation process as part of the solicitation preparation process. Although this requires a greater degree of "guesstimation" than would a later decision point it does allow LCC decisions to interact with other decisions being made during this step of the procurement process.

2. Specificity of LCC Provisions

Requiring notice in the solicitation that life cycle costs will be utilized in the evaluation process is of little use unless the bidder can have some idea of the type

¹⁴¹Comp. Gen. Dec. B-194584, 79-2 CPD § 105 (1979).

¹⁴²Id. at 7.

¹⁴³Dictaphone Corporation, Comp. Gen. Dec. B-200765, 81-1 CPD § 475 (1981); E. Frank Dominguez dba Vanir Research Co., Comp. Gen. Dec. B-197842, 80-2 CPD § 154 (1980); Eastman Kodak Company, Comp. Gen. Dec. B-194584, 79-2 CPD § 105 (1979); United Computing Systems, Inc., Comp. Gen. Dec. B-192298, 79-2 CPD § 8 (1979).

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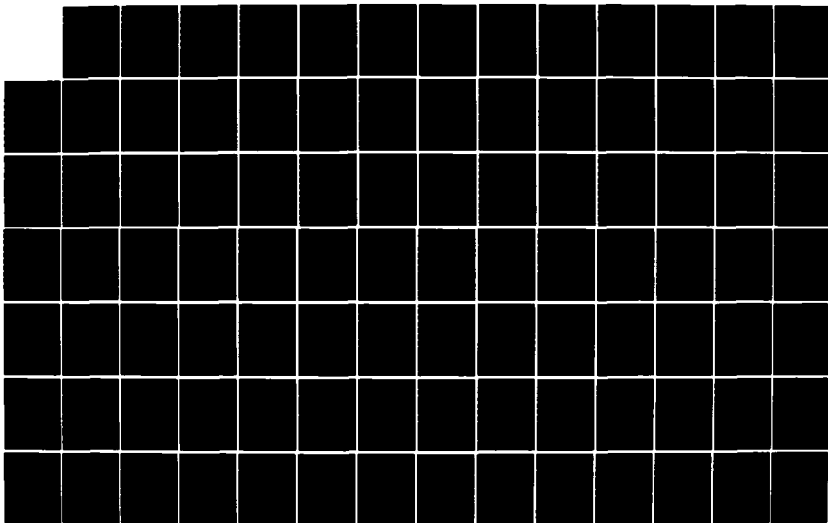
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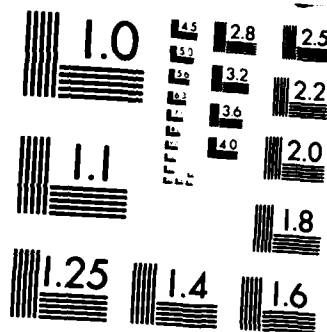
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PREPARING THE SOLICITATION

of factors to be evaluated and the method of evaluation. An early case upholding the use of life cycle costs considered a solicitation which provided:

In comparing bids for award of contract under these specifications, the Government will evaluate such of the following factors the costs of which the contracting officer determines may be estimated with reasonable accuracy:

...
(b) The cost of maintenance over an assumed 15 years of service, such cost to be based solely on the number and location of the active repeater stations included in the bidders [sic] design of the system.¹⁴⁴

An unsuccessful bidder attack the failure of the government to annunciate the factor more specifically. The Comptroller General stated that the criteria to be applied in evaluating the sufficiency of the factor description as follows:

At the minimum the "basis" must be stated with sufficient clarity and exactness to inform each bidder prior to bid opening, no matter how varied the acceptable responses, of objectively determinable factors from which the bidder may estimate within reasonable limits the effect of the application of such evaluation factor on his bid in relation to other possible bids. Factors which are based entirely or largely on a subjective determination to be announced by representatives of the contracting agency at the time of or subsequent to the opening of bids violates the principle for the reason that they are not determinable by the bidder at the time his bid is being prepared.¹⁴⁵

¹⁴⁴36 Comp. Gen. 380, 381 (1956).

¹⁴⁵Id. at 385.

PREPARING THE SOLICITATION

In fact the agency involved, the Department of the Interior, assigned the factor a value of \$3,000 per station per year in calculating the low bid. Despite agreeing with the protestor that the basis of evaluation could have been stated more specifically, the Comptroller General upheld the award finding:

Sufficient data appears to be available to each bidder to permit him to estimate the maintenance cost of his system either on the basis of past experience or some other acceptable method. Further, the stated basis for evaluation seems sufficiently clear and exact to permit each bidder to make at least a reasonable estimate of the effect of the factor on his bid in relation to the bids of others proposing more or less complicated systems.¹⁴⁶

The decision of this case did not require consideration of, and the Comptroller General did not discuss the solicitation provision allowing the contracting officer to choose, after bid opening, the factors to be considered from among those noted in the solicitation. Subsequent cases, however, have established that such discretion is not permissible. In Lanier Business Products, Inc.,¹⁴⁷ a request for quotation on dictation equipment provided life cycle costs would be used but failed to specify any factors to be used in the evaluation. The Comptroller General held

¹⁴⁶Id.

¹⁴⁷Comp. Gen. Dec. B-200695, 60 Comp Gen. 306, 81-1 CPD § 188, aff'd on reconsideration ex rel. Dictaphone Corporation, 81-2 CPD § 511 (1981).

PREPARING THE SOLICITATION

that the solicitation did not "permit fair and equal competition" stating:

We fail to see how a quoter could intelligently submit an offer under the circumstances. ... [I]n most cases the particular elements of the life cycle cost evaluation should be disclosed since they may vary from procurement to procurement and from agency to agency.¹⁴⁸

The life cycle costs associated with a particular product are generally quite large and can run from fuel expenses that may exceed the purchase price many times over during the life of the product¹⁴⁹ to such nebulous areas as the income tax impact of selecting a particular bidder for award.¹⁵⁰ The mere statement that life cycle costs will be considered does not provide prospective bidders with any way to tell how many and which of these multitude of factors are of sufficient concern to the government to be included in the evaluation criteria. This, in turn, does not allow them to prepare a bid or offer based on a product or products most likely to be competitive for the award. Not only may bidders be discouraged from bidding but even among bids received the government may miss an opportunity to choose a product which would ultimately exhibit a lower life cost to the government. Thus a requirement to specify which factors will be considered for award is rational and necessary.

¹⁴⁸Id. at 307-08; 81-1 CPD § 188 at 3.

¹⁴⁹14 Comp. Gen. 268 (1934).

¹⁵⁰43 Comp. Gen. 60 (1963).

PREPARING THE SOLICITATION

Unfortunately, the Comptroller General has failed to consistently apply this requirement subsequent to its promulgation in Lanier.

In Southwestern Bell Telephone Company; Northern Telecom, Inc.¹⁵¹ the solicitation provided that:

In-house costs such as site preparation, environmental requirements, and any adjustments necessary to achieve true comparability, will be included in the evaluation to determine total systems cost to the Government.¹⁵²

The Comptroller General found the failure of the agency to use an LCC factor which was considered significant improper stating:

Where an agency makes it clear that its evaluation will be based on an analysis of expected system life cycle costs without qualification, offerors may reasonably expect that all determinable elements of cost will be taken into account.¹⁵³

The problem with this approach is that it places the burden on the bidder to conclude which factors are "determinable", does not specify whether "determinable" includes full consideration of the cost feasibility of evaluating a particular factor and fails to require an agency to set up any objective solicitation guidelines for how evaluation

¹⁵¹Comp. Gen. Dec. B-200523.3, 82-1 CPD § 203 (1982).

¹⁵²*Id.* at 17.

¹⁵³*Id.*

PREPARING THE SOLICITATION

factors will be selected.¹⁵⁴ As occurred in the cited case, a requirement that evaluation be based on all determinable factors will lead to protesting bidders "shotgunning" numerous unused LCC factors in an attempt to find one which the Comptroller General would find determinable. This approach should be rejected in favor of the Lanier requirement. Solicitations which fail to provide objective guidelines for determining which LCC factors will be used in award determination should, absent highly unusual circumstances, be found deficient and rejected.

Thus, it appears that what should be required in the solicitation is a statement of what will be evaluated and that it need not specify exactly how the evaluation will be conducted. This is in keeping with the GAO's position that evaluation "elements which basically comprise main criteria" need not comply with the disclosure requirements required of primary factors.¹⁵⁵ This makes a reasonable policy given the agency need to alter specific evaluations to provide a

¹⁵⁴The need for the latter is demonstrated in Southwestern Bell where in considering two solicitations the GAO noted:

The need for such disclosure is readily evident from the present case, where even the procurement of identical items by the same agency did not result in use of identical life cycle cost evaluation factors.

60 Comp. Gen. at 308, 81-1 CPD § 188 at 3.

¹⁵⁵AEL Service Corp., Comp. Gen. Dec. B-179703, 74-1 CPD § 217 (1974) at 6.

PREPARING THE SOLICITATION

fair comparison of all bids received.¹⁵⁶ Further, a protest of the actual evaluation criteria used, if not stated in the solicitation, will be timely after award.¹⁵⁷ Dissatisfied bidders, therefore, are fully protected from arbitrary or inaccurate evaluation calculations. Cases directly addressing the degree of specificity required in the notice of evaluation method have been few. This has often been the result of failure of bidders to protest until after the closing date, resulting in the protest being found to be untimely.¹⁵⁸ Most recent cases, do however, appear consistent with the above statement of the requirement.¹⁵⁹ Note, however, that limiting the required disclosure to the factors is premised on the ability of bidders or offerors to make a reasonable evaluation of the effect such factor will have on the comparison of their product with that of others

¹⁵⁶See e.g. Commonwealth Communications, Inc., Comp. Gen. Dec. B-209322.2, 83-1 CPD § 606 (1983). See also Dillon Supply Co., Comp. Gen. Dec. B-203937, 82-1 CPD § 41 (1982); Leon Whitney, Certified Public Accountant, Comp. Gen. Dec. B-190792, 78-2 CPD § 420 (1978).

¹⁵⁷Computer Machinery Corp., Comp. Gen. Dec. B-185592, 55 Comp. Gen. 1151, 76-2 CPD § 128 (1976). See also 4 CFR § 21.205(c)(2) (1984). Cf. Northeast Construction Co., Comp. Gen. Dec. B-205246, 82-1 CPD § 293 (1982).

¹⁵⁸E.g. Federal CSS, Comp. Gen. Dec. B-190708, 79-1 CPD § 48 (1979).

¹⁵⁹See e.g. Eastman Kodak Company, Comp. Gen. Dec. B-194584, 79-2 CPD § 105 (1979); Hasko-Air, Inc., Comp. Gen. Dec. B-192488, 79-1 CPD § 190 (1979). But see Service International, Ltd., Comp. Gen. Dec. B-179595, 74-1 CPD § 18 at 5 (1974) where in dicta the GAO stated a "specific dollar amount would have been required to be spelled out in the solicitation so that ... offerors would have been informed of the financial value to the Government for the proposed factor."

PREPARING THE SOLICITATION

responding to the solicitation. In most cases mere disclosure of the factors being evaluated provides the limited information necessary for bidders to intelligently prepare their bids or offers. Given the necessary imprecision attendant in any LCC evaluation providing the exact formula for factor determination may allow a bidder to "game" the evaluation by carefully grooming his product to the specific formula while allowing other unevaluated components of the same or another cost factor to increase drastically.¹⁶⁰ Such tactics have the potential to badly undermine the viability of LCC evaluations. Further this policy allows consideration of factors which are known at the time the solicitation is issued but for which additional information is needed to prepare the evaluation formula.¹⁶¹ Nevertheless if merely announcing that a factor will be evaluated will not provide bidders with sufficient information to predict the effect of the factor on their products, further information will be required. Given that bidders are effectively on notice that the agency may utilize any evaluation which is reasonable related to

¹⁶⁰Cf. *Tymshare, Inc.*, Comp. Gen. Dec. B-190822, 78-2 CPD § 167 (1978).

¹⁶¹See *Lou Ana Foods, Inc.*, Comp. Gen. Dec. B-209540, 83-1 CPD § 278 (1983), where the GAO approved use of transportation costs as an evaluation factor where the specified delivery points for evaluation purposes were not known at the time of solicitation preparation but would be known by the time the evaluation would be conducted.

PREPARING THE SOLICITATION

measuring the announced factor,¹⁶² only if the factor specified is vague or ambiguous should a solicitation which contained the factor be found insufficient.¹⁶³

Despite the apparent absence of a legal requirement to provide bidders or offerors the substance of the method of actual factor calculation it may be unwise to fail to develop factor evaluation formulas prior to issuance of the solicitation. Such failure could lead to charges that the formulas were not developed in good faith but rather to justify award to a particular bidder. Further failure to consider formula details may lead to solicitation cancellation if adequate evaluation methods cannot be developed to allow reasonable evaluation of a factor stated in the solicitation.¹⁶⁴ Note, however, that the Comptroller General has stated that "withholding of relevant evaluation criteria raises the question of impartiality of the evaluation process."¹⁶⁵ That case did not involve LCC criteria and hopefully the legitimate reasons for

¹⁶²See generally Chapter IV, *infra*.

¹⁶³See North American Telephone Ass., Comp. Gen. Dec. B-187239, 76-2 CPD § 495 (1976) (criteria invalidated due to vagueness). Cf. Telex/Computer Products Division, Comp. Gen. Dec. B-177278, April 19, 1973, Unpub.

¹⁶⁴The GAO has held that when an adequate evaluation cannot be obtained through use of the announced evaluation criteria the solicitation should be cancelled. Crown Laundry and Cleaners, Comp. Gen. Dec. B-196118, 80-1 CPD § 82 (1980).

¹⁶⁵AEL Service Corp., Comp. Gen. Dec. B-179703, 74-1 CPD § 177 (1974) at 5.

PREPARING THE SOLICITATION

withholding the detailed criteria should outweigh any perceived opportunity for impropriety in the evaluation process.

At least one exception to the above analysis has developed. Specificity is required with regard to the time period over which the life cycle cost analysis will be applied. In Philips Business Systems, Inc.¹⁶⁶ the Comptroller General held:

When life cycle costs are to be evaluated, we believe it is appropriate for the solicitation to indicate not only that fact, but also, in most cases, the useful life period that will be utilized in the evaluation.

While the requirement is not stated as an absolute there appears to be little justification for the failure to provide a set time period in the solicitation. The evaluation period will often determine whether sufficient life cycle costs will accrue to offset an initial low price.¹⁶⁷ The General Accounting Office has been very

¹⁶⁶Comp. Gen. Dec. B-194477, 80-1 CPD § 264 (1980) at 3.

¹⁶⁷For a case in which the system life effected the determination of the awardee see Linolex Systems, Inc., Comp. Gen. Dec. B-179047, 53 Comp. Gen. 895, 74-1 CPD § 296, corrective action recommendation modified, 74-2 CPD § 344 (1974). See also Lanier Business Products Inc., Comp. Gen. Dec. B-198913, 80-2 CPD § 194 (1980). However, use of an evaluation period less than the expected life cycle may be acceptable if justified. See Hasko-Air, Inc., Comp. Gen. Dec. B-192488, 79-1 CPD § 190 (1979).

PREPARING THE SOLICITATION

sensitive to this factor¹⁶⁸ and procuring agencies should have well reasoned justification for any failure to state the time frame over which evaluation will be made in the solicitation.

3. Nature and Magnitude of Factor

The use of any LCC factor which can be accurately included in the solicitation may be expected to increase the likelihood of a more cost efficient award, and there is no reason to believe that the magnitude of the expected costs, either in terms of absolute dollars or in comparison to the price or other LCC factors, would be held to preclude its consideration. There are a number of cases, however, stating that specific life cycle cost factors are too speculative for consideration. The Comptroller General has stated that potential variances in the costs of the

¹⁶⁸For protests which have been sustained on this basis see Philips Business Systems, Inc., Comp. Gen. Dec. B-194477, 80-1 CPD § 264 (1980); United Computing Systems, Inc., Comp. Gen. Dec. B-192298, 79-2 CPD § 8 (1979). But see Harris Corporation, Comp. Gen. Dec. B-192632, 79-1 CPD § 235 (1979) (Agency refusal to state evaluation time frame was not cause to upset award where protestor would not be low under either potential life cycle time frame) and 51 Comp. Gen. 102 (1971) (Although not stated in solicitation, 5 year evaluation life was reasonable and within bidders' expectations based upon the nature of the product and procurement circumstances). It is unclear whether Phillips fully repudiated the rationale of the latter case.

PREPARING THE SOLICITATION

government's self-insurance program,¹⁶⁹ loss of business on a government owned railroad,¹⁷⁰ increases in unemployment compensation in a given area,¹⁷¹ transportation insurance,¹⁷² potential patent infringement actions,¹⁷³ potential termination costs if the government terminates the contract for convenience,¹⁷⁴ and income tax revenues¹⁷⁵ are too speculative for use in award evaluation. These holdings, however, were made in rejecting protestor claims that the specific factors should have been considered. The one factor, residual value, which the Comptroller General has specifically declined to allow an agency to use,¹⁷⁶ was specifically approved in a subsequent decision.¹⁷⁷ While noting that factors incapable of being determined with "reasonable certainty" may not be used for evaluation the Comptroller General stated:

¹⁶⁹Southwestern Bell Telephone Company, Comp. Gen. Dec. B-200523.3, 82-1 CPD § 203 (1982); General Telephone Co. of California, Comp. Gen. Dec. B-190142, 78-1 CPD § 148, aff'd on reconsideration, 78-2 CPD § 395 (1978).

¹⁷⁰45 Comp. Gen. 59 (1965).

¹⁷¹Id.

¹⁷²Coastal States Petrochemical Co., Comp. Gen. Dec. B-168570, June 10, 1970, Unpub.

¹⁷³RAI Research Corp., Comp. Gen. Dec. B-184315, 76-1 CPD § 99 (1976).

¹⁷⁴Hawaiian Telephone Co., Comp. Gen. Dec. B-187871, 77-1 CPD § 298 (1977).

¹⁷⁵43 Comp. Gen. 60 (1963).

¹⁷⁶33 Comp. Gen. 108 (1953).

¹⁷⁷Remington Rand Corporation, Comp. Gen. Dec. B-204084, B-204085, B-204085.7, B-204085.6, 82-1 CPD § 408 (1982).

PREPARING THE SOLICITATION

residual value is a proper factor to be considered in the IFBs' life cycle cost formula; it simply is a cost element that logically cannot be ignored despite the observed difficulty in determining what the precise residual value of each tested model is. ... [The procuring agency] had an objective approach to the task, which we do not find to be unreasonable.¹⁷⁸

Recent cases tend to confirm that use of factors will not be precluded simply because the effect of the factor on the procurement decision is indirect or attenuated. These conditions do, however, make it more difficult to develop accurate data so that a reasonable evaluation of such a factor can be made. This inability may in turn lead to the rejection of the use of a factor.

In supporting a contracting officer decision not to evaluate certain life cycle costs the GAO has stated that "negligible" factors need not be considered.¹⁷⁹ However, the Comptroller General has never overturned an agency decision to consider a life cycle cost factor on the basis that the impact of the factor was negligible. In light of the broad discretion granted the contracting officer in this area, it appears most unlikely that any "inherent" uncertainty (as opposed to an inability to adequately apply the factor) of a

¹⁷⁸Id. at 13.

¹⁷⁹Cincinnati Bell Telephone Company, Comp. Gen. Dec. B-207177, 83-1 CPD § 41 (1983). See also Burroughs Corporation, Comp. Gen. Dec. B-190222, 77-2 CPD § 422 (1977).

PREPARING THE SOLICITATION

given life cycle cost factor will provide grounds for a successful protest if the evaluation scheme allows a reasonable prediction of the cost impact of the factor, no matter how small.

4. Accuracy of available data

The accuracy of the evaluation basis is important at all stages of the life cycle cost process. The feasibility of obtaining data with which to evaluate life cycle cost must be considered at the initial use consideration phase. After passing that hurdle it must again be faced in preparing the solicitation. The Comptroller General has repeatedly held that the use of speculative evaluation factors is prohibited.¹⁸⁰ This is, in effect, another way of phrasing the often reiterated requirement that the evaluation method utilized be reasonably designed to insure the lowest cost to the government. Unfortunately there are almost no cases discussing the degree of data accuracy which is required as a predicate for the use of life cycle costing in the evaluation process.

In Hasko-Air, Inc.¹⁸¹ The Comptroller General noted that:

¹⁸⁰Southwestern Bell Telephone Company, Comp. Gen. Dec. B-200523.3, 82-1 CPD § 203 (1982)(government self-insurance costs); 50 Comp. Gen. 637 (1971)(cost of change in contractor); 45 Comp. Gen. 434 (1966); 33 Comp. Gen. 108 (1953)(automobile trade-in value).

¹⁸¹Comp. Gen. Dec. B-192488, 79-1 CPD § 190 (1979).

PREPARING THE SOLICITATION

[p]rocurring activities have broad latitude in determining methods of evaluation, so long as these methods provide a rational basis for source selection.¹⁸²

In applying this "test" the agency added \$2,500 to Hasko-Air's offer to cover the estimated cost of performing certain maintenance tasks necessary for the protestor's product but not those of other offerors. This adjustment was upheld as being "both reasonable and in accord with the evaluation criteria listed in the solicitation."¹⁸³ The \$2,500 was based upon government estimates of manhours required to perform the task, the current labor rate for the needed labor specialties and the expected repairs required at each maintenance interval.¹⁸⁴ The requirement of reasonableness has been reiterated in other cases¹⁸⁵ and appears to be the primary "test" the General Accounting Office will apply in reviewing the method of calculating a given life cycle cost evaluation factor. Thus where the government employed reasonable validity testing of its estimates the GAO upheld their use in evaluating operating and maintenance costs though those costs were admittedly

¹⁸²Id. at 3 (emphasis added).

¹⁸³Id. at 1 (emphasis added).

¹⁸⁴Id. at 3.

¹⁸⁵See e.g. Lanier Business Products, Inc., Comp. Gen. Dec. B-203337, 81-2 CPD § 265 (1981); Eastman Kodak Company, Comp. Gen. Dec. B-194584, 79-2 CPD § 105 (1979).

PREPARING THE SOLICITATION

"incapable of precise assessment."¹⁸⁶ An additional requirement that the evaluation be conducted in "good faith"¹⁸⁷ would appear to preclude the preparation of LCC calculation methods which, though reasonable, were solely designed to benefit one bidder over another.

Given the limited number of cases decided it is difficult to determine the outer limits of agency discretion established by the "reasonableness" review standard. It is clear, however, that the thrust of the standard is that the evaluation scheme be structured so as to improve the opportunity of the government to obtain the lowest overall cost on the procurement.¹⁸⁸ Certain cases imply that this requirement is an affirmative duty, that is that government must develop the criteria so that it results in the selection of "the lowest probable cost offer."¹⁸⁹ However, a review of the cases in the area indicates that the "duty" is not nearly so broad, and is more accurately spoken of in

¹⁸⁶51 Comp. Gen. 102, 109 (1971).

¹⁸⁷Hasko-Air, Inc., Comp. Gen. Dec. B-192488, 79-1 CPD § 190 (1979) at 3-4.

¹⁸⁸Thus when an evaluation is based on an estimate, the exact estimate should be used as the evaluation adjustment factor. See 49 Comp. Gen. 98 (1969) (use of "rounded" \$40,000 evaluation factor improper when actual government estimate of factor impact was \$41,000).

¹⁸⁹United Computing Systems, Inc., Comp. Gen. Dec. B-192298, 79-2 CPD § 8 (1979) at 6. See also 14 Comp. Gen. 268 (1934) (CO duty to award to lowest bidder on basis of price and operating expenses). Taking such a broad statement of the requirement at face value, the use of any life cycle cost criteria would require evaluation of all feasible criteria.

PREPARING THE SOLICITATION

the negative. Rather what the actual standard appears to prohibit is criteria which not only fails to advance the quest for the lowest probable cost offer but actually retards that search.¹⁹⁰ Thus, the Comptroller General has held that an agency may not accept a bid which is higher than the low bid based on price where "[t]here is no persuasive evidence in the record to support the agency's conclusion that life-cycle costs are higher" for the lower priced item.¹⁹¹ However, it appears that even where the data used in a solicitation or evaluation proves erroneous its use will be upheld if it was the best available for the purpose.¹⁹²

In most cases the accuracy problem lies not with the solicitation but the evaluation itself.¹⁹³ However, it is possible to establish evaluation criteria within the solicitation which are, per se, invalid. Perhaps, the fact that there are no cases finding such an invalid solicitation

¹⁹⁰Thus, the GAO has allowed evaluation of transportation costs based on tentative destinations on the basis that the actual delivery points were not yet known and the tentative points allowed a better evaluation than would be obtained by totally ignoring such costs. *Eaton, Inc.*, Comp. Gen. Dec. B-189362, 77-2 CPD § 414 (1977).

¹⁹¹*Cleaver Brooks*, Comp. Gen. Dec. B-213000, 84-2 CPD § 1 (1984).

¹⁹²*Pacific Architects & Engineers, Inc.*, Comp. Gen. Dec. B-212257, 84-2 CPD § 20 (1984).

¹⁹³See e.g. *Commonwealth Communications, Inc.*, Comp. Gen. Dec. B-209322.2, 83-1 CPD § 606 (1983) and *Leon Whitney, Certified Public Accountant*, Comp. Gen. Dec. B-190792, 78-2 CPD § 420 (1978), discussed infra at pages 152-53. See also 37 Comp. Gen. 330 (1957).

PREPARING THE SOLICITATION

is testimony to the wide latitude the Comptroller General has given contracting officers in this area. In one case, however, the Comptroller General has challenged an agency evaluation result on accuracy grounds. While declining to invalidate the award the agency was advised to reaccomplish the evaluation.¹⁹⁴

In summary, the best rule of application which can be developed based on existing precedent indicates that a solicitation evaluation provision will be invalidated only if:

- 1) it was prepared in bad faith with the intent to benefit/burden certain bidders or groups of bidders;
- 2) the evaluation procedure established clearly fails to allow the comparison of bids on an equal "cost-to-the-government" basis; or
- 3) the evaluation method is unreasonable, that is, the evaluated cost it produces clearly lack any rational relation to the actual cost which the government will incur.

4. Other requirements

The above factors may be expected to be the primary areas with which a contracting officer need be concerned in preparing the life cycle cost provisions of a solicitation. However, the "rules" in this area are far from settled and

¹⁹⁴General Telephone Co. of California, Comp. Gen. Dec. B-190142, 78-2 CPD § 395 (1978).

PREPARING THE SOLICITATION

as the Comptroller General has an opportunity to pass on more award determinations involving the consideration of life cycle costs additional requirements or restrictions will arise. One such "additional" requirement was announced in Sayles Biltmore Bleacheries, Inc.¹⁹⁵ which holds that it is improper to consider only a portion of a specific evaluation factor.

In that case the agency had evaluated only a portion of the transportation costs from the bidders' plants to the government's ultimate destination. The basis of this holding is reasonable to the extent that if consideration of a given factor is appropriate and feasible the evaluation of the entire factor should be considered as enhancing the probability of an lower ultimate cost to the government. Such was the situation in Sayles, the transportation costs which were ignored were as valid and susceptible of determination as those which were considered. The case should not, however, be read as requiring rejection of an evaluation factor consisting of a determinable portion of a particular life cycle cost simply because one or more of the other parts of that factor cannot be adequately evaluated.¹⁹⁶

¹⁹⁵Comp. Gen. Dec. B-185262, 76-2 CPD § 53 (1976).

¹⁹⁶Cf. Data 100 Corp., Comp. Gen. Dec. B-185884, 76-2 CPD § 80, aff'd on reconsideration 76-2 CPD § 354 (1976)(recurring maintenance of data processing equipment evaluated but unscheduled maintenance calls not evaluated).

PREPARING THE SOLICITATION

B. SOLICITATION LANGUAGE

The actual solicitation language used to implement the use of life cycle costs in award process need not be extensive. In cases where bidders and offerors are expected to offer off the shelf items there maybe no benefit to stating the award evaluation scheme with more specificity than is required by the Comptroller General. In cases where bids or proposals will be based on a new design there is often much to be gained in including the specific criteria and weighing scheme to be used. Note, however, that the inclusion of specific evaluation formulas limits the procuring agency's ability to alter the evaluation scheme after bid opening or receipt of best and final offers.¹⁹⁷ Actual LCC solicitation provisions used successfully in a number of procurements covering a variety of item types are set out in DOD Publication LCC-2.¹⁹⁸ The example cases discussed therein provide a wealth of information on drafting specific LCC solicitation provisions and provide

¹⁹⁷See Bunker Ramo Corp., Comp. Gen. Dec. B-187645, 56 Comp. Gen. 712, 77-1 CPD § 427, aff'd on reconsideration, 77-2 CPD § 124 (1977), discussed *infra* at note 207 and accompanying text.

¹⁹⁸"Casebook of Life Cycle Costing in Equipment Procurement", Department of Defense, Washington, D.C., July 1970.

PREPARING THE SOLICITATION

detailed discussions of problems which arose over the provisions.

One provision which should be specifically included in each solicitation which will be evaluated on the basis of life cycle costs is a provision indicating that all costs will be adjusted for the time cost of money. As indicated in Chapter I adjustments of cost factors to compare them on the basis of their cost in terms of current dollars is an integral part of the life cycle costing process. Nevertheless the Comptroller General has treated the time cost of money adjustment as a separate evaluation criteria. Thus to make use of the adjustment the solicitation must clearly indicate that the various elements of the procurement's will be adjusted for this factor.¹⁹⁹ Failure to inform bidders that such an adjustment will be made precludes any consideration of cost timing in the evaluation process.²⁰⁰ Contractor arguments that failure to "automatically" adjust cost factors for the cost of money

¹⁹⁹In all likelihood merely stating that a time cost of money adjustment will be made is sufficient, without including the method of actual calculating the adjustment within the solicitation. The Comptroller failed to comment on a solicitation provision which noted that award would be based on the "lowest (present value discounted) systems life cost...." Interscience Systems, Inc., Comp. Gen. Dec. B-199918.2, 81-1 CPD § 222 (1981) at 1.

²⁰⁰Refre and Associates, Comp. Gen. Dec. B-196097, 80-1 CPD § 298, aff'd on reconsideration, 80-2 CPD § 13 (1980); Linolex Systems, Inc., Comp. Gen. Dec. B-179047, 53 Comp. Gen. 895, 74-1 CPD § 296, corrective action recommendation modified, 74-2 CPD § 344 (1974).

PREPARING THE SOLICITATION

have been universally unsuccessful, even where failure to consider the factor clearly results in an award which will ultimately cost the government more.²⁰¹

At least where post-acquisition costs are involved the Comptroller's position appears unfortunate. Failure to adjust such costs undermines the accuracy of the life cycle cost evaluation. In cases where the life cycle of the product is long and the timing of cost incurrence between competing products is significant such a failure may totally negate the value of life cycle costing. While the author agrees that bidders should be made aware that a cost of money adjustment will be made, the most reasonable approach to this problem would appear to be a GAO requirement that all life cycle cost factors be adjusted. This would enhance the accuracy of the low bid determination and would place bidders on notice that the adjustment would be made in all cases. Inclusion of the factor requires a purely mathematical manipulation which should not unduly increase the complexity of the procurement.²⁰² While adjustment rates can be established to reflect the actual cost of

²⁰¹ In *Refre*, supra, the difference between the protestor's bid and that of the bidder receiving award was only 58 dollars; a time cost of money adjustment would clearly have exceeded \$1,000.

²⁰² Note, however, in *Linolex Systems, Inc.*, supra note 200, the Comptroller General disapproved the application of annual time cost of money adjustments when actual cost incurrence was based upon monthly payments.

PREPARING THE SOLICITATION

government capital,²⁰³ the Office of Management and Budget has specified 10% as the discount rate to be applied in evaluation the costs of government investments²⁰⁴ and application of this rate in BCC adjustments would provide both a stable²⁰⁵ method of adjustment and clear notice of the nature of the adjustment to all bidders.

²⁰³Linolex Systems, Inc., supra note 200 (rate fixed at current average market yield on outstanding treasury marketable obligations at the time proposals are received).

²⁰⁴OMB Circular A-94, "Discount Rates to be Used in Time-distributed Costs and Benefits", March 27, 1972.

²⁰⁵The established rate has not been revised in more than 12 years. Id.

CHAPTER IV.

THE EVALUATION PROCESS

During the actual evaluation of bids or proposals consideration must be given not only to the criteria established in the solicitation but also the characteristics of each bid or offer. The Comptroller General has probably invalidated more LCC based awards due to faulty evaluations than for any other reason.²⁰⁶ To a large extent the difficulties leading to the invalid evaluations began with the preparation of the solicitation. Many life cycle cost evaluation schemes are prepared without sufficient consideration being given to how that scheme will mesh with all potential bids which might be found to be responsive or offers within the competitive range. This chapter begins with a discussion of how the evaluation scheme or method may be developed. This development process should generally be undertaken prior to issuance of the solicitation to insure that announced LCC factors can be adequately evaluated when bids are opened or best and final offers received. To the extent that calculation formulas are not included in the solicitation it is possible, but not necessarily desirable,

²⁰⁶See e.g. H. Frank Dominguez dba Vanir Research Co., Comp. Gen. Dec. B-197842, 80-2 CPD § 154; C. L. Systems, Inc., Comp. Gen. Dec. B-197123, 80-1 CPD § 448 (1980); Leon Whitney, Certified Public Accountant, Comp. Gen. Dec. B-190792, 78-2 CPD § 420 (1978); 52 Comp. Gen. 614 (1973).

THE EVALUATION PROCESS

to leave final determination of data sources and feasibility evaluations until after bids are received.

Anticipating the wide range of both conventional and innovative products which may be offered in response to an IFB or RFP is difficult and in some cases probably impossible. Thus it is not sufficient in the award evaluation to assume that all that is required is a direct application of the evaluation scheme developed during solicitation preparation. It is also necessary to understand what adjustments in the evaluation criteria are permissible and when it may be necessary to cancel the solicitation and begin the process again, this time with a better understanding of the potential products which may be submitted by bidders or offerors. Due to significant legal distinctions it is appropriate to discuss two separate concepts: 1) Development or alteration, after bid opening, of factor calculation criteria not contained within the solicitation or made known to all bidders or offerors; and 2) cases where the contracting agency finds a need to alter announced LCC factors or their calculation criteria. The latter category includes only those cases involving criteria

THE EVALUATION PROCESS

contained within the solicitation or in supplemental information provided for use in bid or offer preparation.²⁰⁷

A. DEVELOPING THE EVALUATION SCHEME

The development of an evaluation scheme involves consideration of: 1) the method of calculation and data needed for the evaluation of a given factor, 2) potential sources of that data, 3) the relative accuracy and cost of each potential data source, and 4) special LCC considerations which are inherent in a valid life cycle cost analysis. At the beginning of this process it must be understood that the decisions made as a result of the "Deciding to Use" analysis must be considered working parameters only. Occasionally a new factor not previously considered will surface warranting inclusion in the solicitation. More often one of the chosen factors will be eliminated due to problems with its actual evolution into

²⁰⁷In this regard the GAO has held:

[Assuming a protestor] had obtained the precise formula from some source within the [procuring agency] prior to proposal submittal, [the protestor] would be in no position to insist that the [agency] adhere to that unpublished evaluation formula and would run the risk that the formula would be changed so long as the change was consistent with the published criteria available to all competitors.

Bunker Ramo Corp., Comp. Gen. Dec. B-187645, 56 Comp. Gen. 712, 718, 77-1 CPD § 427 at 9, aff'd on reconsideration, 77-2 CPD § 124 (1977).

THE EVALUATION PROCESS

written solicitation provision. In either case the process must be flexible to allow the best possible evaluation of the procurement.

At this point consider an example procurement in which the Navy wishes to install a sophisticated navigational system throughout the Pacific Ocean. It envisions a system of fixed transmission sites on various islands such that the Navy's nuclear missile submarines will always be within range of two of the transmitters and thereby able to triangulate their position while remaining submerged. The system will have to use extremely long wave energy because of the need to transmit through water. Transmitters of the type needed exist and to insure reliability only equipment which has demonstrated reliability in commercial use for at least two years will be considered to comply with the contract requirements. Products produced by four companies can satisfy this requirement. Bidders will be required to develop specialized antennas for the new system. All necessary technology is well established and a decision has been made to obtain the system by advertised procurement using functional specifications. Tests indicate that to maintain a 99% confidence that contact will be achieved the signal reaching the ship must have a specified strength at all points within the submarine operating area. Bidders will be required to propose the number and location of their sites to meet this signal strength requirement. In addition

THE EVALUATION PROCESS

to price, three LCC factors have been identified as important in determining total system life costs: power consumption, installation, and maintenance.

1. Establishing the method of calculation and data needs

The first step in the development of the evaluation scheme or plan must be the creation of the method which will be utilized to weigh each of the factors after bids are received. This, in turn, generates the types of data needed to accomplish the evaluation of the factor. The object of any LCC analysis is to reduce a cost factor to a dollar and cents figure to be added to the price and other LCC factors to arrive at the total life cycle cost. This amount is then compared against the total life cycle cost of other bidders' products. It is necessary to develop a method to obtain that dollar and cents amount. For example with our power consumption factor this stage is relatively simple. The total cost of this factor will be the cost of electricity (in \$/watt-hour) times power consumed (watts) times the system life (in hours).²⁰⁸ This factor can, therefore, be defined by three components, each of which is relatively stable, and is not interdependent on other factors within the equation. Other factors may have extremely large numbers or components, some of which may be contingent upon still other factors. Thus maintenance costs might be stated

²⁰⁸For purposes of our example we anticipate nonstop operation of the transmitters.

THE EVALUATION PROCESS

as the cost of labor (\$/hour) times the number of hours of maintenance needed per hour of operation times the system life (hours). However, because the transmitter sites will probably be located at remote locations, transportation of maintenance personnel to and from the site will likely be an important consideration. This component is effected not by the number of hours of maintenance needed but how often maintenance will be needed. Spare parts could also be included as a cost of maintenance. Thus it may be necessary to develop a complex equation to evaluate the maintenance LCC factor.

Many other factors could also play a legitimate part in the equation. Each new factor will normally require at least one and often several new types of data to be effectively evaluated. It becomes necessary therefore to limit the calculation equation to a workable number of components. Just how many is enough depends on the overall contribution of the various components. Sometimes it is impossible to guess the cost impact of a component without actually obtaining the data relating to it, that is actually evaluate the factor in detail. More often, however, an educated examination of a factor will indicate which of its components are likely to be of significant dollar value and which are negligible. Admittedly the failure to consider any component of a factor which will actually impact the life cost of the factor will result in potential error in

THE EVALUATION PROCESS

the costing of that factor, however, it must be kept in mind that the entire process is one of estimation and the addition of minor components or the division of major components into several minor ones may add nothing to the overall accuracy of the factor estimation. Factor calculation equations should, therefore, be kept to a minimum of complexity commiserate with the overall size of the factor's importance and the ability of such an equation to represent at least the majority of the cost impact of the factor. Even though a given factor appeared appropriate for life cycle costing in the "applicability" phase it may be necessary to reject the factor as unfeasible if it is incapable of estimation without inclusion of an unreasonable number of factors. Note, however, that if evaluation of a significant portion of the factor is to be omitted it may be necessary to recharacterize the factor in the solicitation description to more accurately describes the type of costs which are actually being considered. For example if only maintenance labor costs are to be evaluated it may be more appropriate to state the evaluation factor as "maintenance labor" rather than "maintenance". This precludes the possibility that the solicitation will be found deficient for considering only a portion of a stated factor.²⁰⁹

²⁰⁹See Sayles Biltmore Bleacheries, Inc., Comp. Gen. Dec. B-185262, 76-2 CPD § 53 (1976), discussed *supra* at note 195 and accompanying text.

THE EVALUATION PROCESS

To the extent that no component of the LCC factor is excluded an LCC equation will yield an accurate representation of the actual life cycle cost attributable to a given item. Of course, this accuracy is dependent upon the degree of reliability of each component itself. The source of the data comprising the necessary components is the next consideration in the development of a viable evaluation scheme.

For the purpose of our example assume that an initial evaluation indicates that the electrical consumption factor should be based upon electrical consumption, installation upon man hours to install plus a delivery factor based upon the location of the transmitter sites as proposed by the bidder, and that maintenance will be based upon both manhours and maintenance travel expenses.

2. Availability and Source of data

Once a decision is made as to which method to use in evaluating a factor and the data needed is determined, the contracting officer must evaluate potential methods of obtaining that data and select one. This is one of the most crucial decisions in the solicitation preparation process, having a greater impact on the entire LCC process than might be expected. Award evaluations based on price alone need not be concerned with this decision. Price is always

THE EVALUATION PROCESS

contractor produced information upon which the government can rely because of the firm bid rule,²¹⁰ the restatement of the price within a term of the contract itself and the government's firm control over actual payments to the contractor. Except in cost reimbursement contracts there is never a question as to its availability for use in making an award decision. This situation is quite different with life cycle costs. Except in the rare case where post acquisition services are to be provided by the contractor as part of the procurement of goods,²¹¹ post-acquisition costs will be incurred by the government outside the contract relationship. The life cycle cost analysis is used only for the purpose of selecting the bidder to receive award. Its usefulness dies with the making of an award. Because it is merely a tool of the procurement process, the government is free to base its evaluation on any rational basis. The first step in determining which data source to use is examining the various methods of obtaining data. At least four methods have been used with success and warrant review: evaluation testing, third party data, government data, and contractor-supplied data.

²¹⁰FAR § 14.303(a) (1984).

²¹¹In effect these situations, whether they arise by direct contract provision or pursuant to a warranty, are actually cases where the downstream costs become acquisition costs, in effect part of the price and need not be evaluated using LCC techniques.

THE EVALUATION PROCESS

a. Evaluation testing

Undoubtedly the most accurate way to acquire the needed data in most cases is to test the actual products being considered. This process is commonly referred to as benchmarking. As to the physical characteristics of the item being offered (e.g. weight, size) and its directly measurable performance capability (e.g. power, fuel consumption) such testing can virtually eliminate measurement error.²¹² Even as to parameters which cannot be measured with absolute precision because they will vary with each use (e.g. time between failures, task performance time) testing, when properly conducted, can provide highly accurate average or mean values which are generally far superior to estimates made on the basis of design data. Two types of testing schemes have been widely used.²¹³ The first, and most common is the award benchmark. Bids or offers are reviewed for compliance with the solicitation and the products of all conforming bidders or offerors are then tested prior to contract award. The results of the tests are then "plugged" into the evaluation equation and each

²¹²With regard to mass purchases, however, care must be taken to ensure that a sufficient sample size is used or that variance among production items or between production items and test items is negligible.

²¹³Actually a third method, post award benchmarking, has also been used, however this method is used only to verify contractor submitted data and does not represent an independent data acquisition method.

THE EVALUATION PROCESS

product is assigned its resultant life cycle cost.²¹⁴ In negotiated procurements a two step procedure may be utilized with benchmarking of only those products found to be in the competitive range, negating the need to test large numbers of products which have no significant chance of receiving the award.

A variation of this method involves giving potential bidders an opportunity to have their products tested as part of a special test program. The government agrees to test all items of the type it expects to need for a specified time into the future. Interested parties are notified that all solicitations for the particular item involved will be based on a life cycle cost analysis which will use as its basis the data generated by the testing program. Items not tested as part of the program will be ineligible for award. This process, which has been specifically approved by the Comptroller General,²¹⁵ has several advantages. First it allows detailed testing for which there may not be sufficient time during the period between identification of a particular requirement and the point when award must be made. Second, it allows a single testing to serve for multiple procurements, a considerable savings if the test

See e.g. Computer Sciences Corporation, Comp. Gen. Dec. B-195982, 80-2 CPD § 424 (1980); Tymshare, Inc., Comp. Gen. Dec. B-190822, 78-2 CPD § 167 (1978).

²¹⁵Remington Rand Corporation, Comp. Gen. Dec. B-204084, 82-1 CPD § 408 (1982).

THE EVALUATION PROCESS

procedure is expensive. Lastly, the results of the test are released to the bidders prior to bid closings and the relative rankings may make certain bidders inclined to reduce their price in an effort to remain competitive with producers with better test performance. Such an influence has the potential to reduce not only the initial cost but also the ultimate life cost to the government. Recent use of this method for the procurement of typewriters led to prices as much as 15 percent below those obtained under the prior procurement method.²¹⁶ The period over which the test will be mandatory should, however, be based upon the stability of the item's technological development and marketplace. Because new producers entering the market and new products by established producers are "locked out" until the next test, an excessive period between testings may preclude the government from obtaining a new, improved product and will almost certainly reduce competition to some degree.

The principle problem with benchmarking is that it is generally the most expensive process, in terms of both time and money, for the accumulation of needed data. Further, certain evaluation factors, particularly maintenance factors, are difficult to approximate with appropriate tests. Nevertheless experience has demonstrated that benchmarking is an excellent way to provide for

²¹⁶Id., at 10.

THE EVALUATION PROCESS

consideration of life cycle costs for certain products. Benchmarking is particularly effective where large quantities of a particular product are needed so that testing costs may be amortized over the bulk purchase.

b. Third party data

Third party data is information, of proven reliability, from a source other than potential bidders, their trade associations, or the procuring agency. Third party data is often as accurate as benchmarking and requires little or no expense to the government. Further the use of such data generally allows the procuring agency to avoid charges that it has skewed the award criteria in favor of, or against a particular bidder. A common example of such data is the Environmental Protection Agency's automobile fuel efficiency ratings. The agency publishes results of annual testing of new car's fuel efficiency which can be plugged directly into a life cycle costing formula along with the anticipated life of the car to provide an accurate picture of the vehicle's fuel costs. When available, the fullest use of such data should be made. Unfortunately such data is rare and even more rarely is it directly applicable to the product being purchased. Even in cases where better data could be obtained the ease of use and low cost of third party data should be considered before a contracting officer selects another method of acquiring needed data.

THE EVALUATION PROCESS

c. Government data or estimates

The components of LCC factors should be determined by use of prior government experience or estimates only when the component cannot reasonably be expected to depend upon the characteristics of the product being procured. The use of data based on the government's cost experience or estimate of expected costs has been used for a number of years in approximating the operating and maintenance costs on government purchases.²¹⁷ Recent cost experience is an excellent method of determining such LCC components as operation and maintenance labor costs per hour and physical plant costs per square foot. Components such as these are generally independent of the characteristics of the product involved and can be combined with other, product dependent, components, such as maintenance man-hours required and system floor space requirements to create a usable factor. As the components become more and more dependent upon the characteristics of the product to be procured the greater the inaccuracy of using prior experience with other products to develop a workable approximation of the component.

To obtain the maximum benefits from using life cycle costs in the evaluation process, contracting officers must generally avoid adopting a component based upon the

²¹⁷See e.g., 36 Comp. Gen. 380 (1956).

THE EVALUATION PROCESS

performance of similar products already in use or upon the product the procurement is designed to replace. Such use of prior experience data does not provide any reward for a new product's innovative approach to doing the job at a lower overall cost. Assignment of a set component value destroys one of the degrees of freedom present in the life cycle cost factor, and reduces the potential variance between the products being evaluated.

An example serves to illustrate this point. Consider the power consumption portion of our submarine communication procurement evaluation. We could, based upon experience, note that the average price per kilowatt hour for electricity bought by the government in the South Pacific was 1.5 cents. Although we know that the actual cost varies island to island from .8 cents to 4.2 cents, this component of the power consumption factor could be pegged at 1.5 cents for evaluation purposes. Unfortunately this scheme fails to reward a bidder who, upon careful consideration designed his system to be installed at locations where commercial power was least expensive. In so doing the evaluation will underrate such a product and the government may not obtain the system with the lowest overall costs. On the other hand, if the sites were fixed in the contract then all bidders would be forced to use power at a specified rate and it would be appropriate to establish this component as a constant.

THE EVALUATION PROCESS

Such component assignments can destroy all degrees of freedom in the evaluation factor and thereby render it useless. In our above example, if in addition to the power price component the contracting officer were to decide to assign the total power consumption rate (kw/hour) of the system on the usage of a prior long wave transmitter system in use in the Atlantic Ocean, then the entire power consumption factor becomes a constant for all bidders and will have no effect on the award determination at all! Care must be exercised to avoid determining that a given factor will have a significant potential variance between bidders in the "factor identification" phase only to destroy much or all of that potential variance when the actual evaluation equation is developed.

By necessity government estimates must almost always be product independent and therefore, suffer from the same potential problems as the use of data based upon prior government experience. In addition, an estimate lacks the certainty which comes from actual measured experience and

THE EVALUATION PROCESS

thereby will often suffer from a lesser degree of accuracy.²¹⁸

d. Contractor supplied data

When needed data is a function of the physical condition or operating parameters of the product being procured it can generally be obtained by requiring the contractor to provide it as part of his bid or offer. Data needed to establish more factor components are probably obtained by this method than any other. In many cases it is the only source from which needed data can come. Next to the application of third party data it is by far the simplest and least expense method of obtaining data. Unfortunately its use generally creates an immediate problem of insuring that bidders will not submit data indicating an unduly "rosy" picture of their products' post-acquisition costs in order to obtain the award. Contract mechanisms to discourage this possibility are essential to the use of any contractor data for the purpose of making an award. Chapter V deals with this subject in detail. It is sufficient to say at this point that the use of contractor supplied data

²¹⁸In recent years, however, the government has made strides in parametric cost estimating, an evaluation technique in which the cost of a new item is estimated by relating its costs to specific physical properties and/or performance characteristics. The needed relationships are based upon empirical data observed on similar existing items. Use of such a process to estimate life costs has been approved by the Comptroller General. LTV Aerospace Corp., Comp. Gen. Dec. B-183851, 75-2 CPD § 203 (1975).

THE EVALUATION PROCESS

generally requires a complex penalty clause in the solicitation and may create a significant increase in post award administration. If another data source is available, this additional complexity must be considered prior to the selection of the contractor as a data source.

One use which does not create this problem is a solicitation requirement that the contractor "bid" on certain maintenance or operation services during the useful life of the product. These "bids" are used only to plug into the LCC equations and do not bind the government to obtain the services from the bidder. They do, however, bind the bidder and allow the agency to accurately evaluate these costs for lengthy periods which might otherwise be impossible.²¹⁹

It must be emphasized that data source selection must be considered for each component of each factor separately. In most cases this will result in the use of more than one and occasionally all four sources within a given procurement

²¹⁹A problem exists, however, with this situation where the bidder is a regulated common carrier. In American Telephone & Telegraph Co., Comp. Gen. Dec. B-200989, 81-2 CPD § 157 (1981), the GAO held that by virtue of such status the bidder's offer to provide maintenance services in later years was subject to change by regulatory procedure, was not, therefore, firm and as a result the bid on this item was nonresponsive. But see Anchorage Telephone Utility, Comp. Gen. Dec. B-197749, 80-2 CPD § 386 (1980), where a bidder was allowed, after bid opening, to indicate it would not seek a rate change before the applicable state utility commission and such representation was sufficient to allow consideration of the bid.

THE EVALUATION PROCESS

or even within a particular factor. If after careful consideration no method can be found to obtain the data, a rare but possible situation, it will be necessary to redraft the factor equation or if this is not possible reject the entire factor as infeasible.

3. Feasibility of Data Source

The feasibility of using a particular method of obtaining data is dependent upon its time requirements, cost, and accuracy. After the contracting officer has examined all possible methods and determined which could be used to obtain the needed data he must compare the feasibility of each and determine which should be used.

a. Time constraints

Timing is an important consideration for the use of benchmarking, where government data require compilation or where use of a government estimate is envisioned. Almost all procurements have a maximum time frame within which a contract award must be made. Normally this time period is dictated by the urgency of the agency requirement for the product to be procured or the need to obligate funds prior to the expiration of a funding authorization. Even where absolute time constraints are not restrictive, if the time needed to obtain data by a particular method would delay the expected procurement timetable the benefit of using the method should be weighed against the attendant delay.

THE EVALUATION PROCESS

Certain types of data, particularly such important LCC data as mean time between failure, preventive maintenance intervals and shelf life, often require lengthy testing and may not be feasible in the time constraints under which many procurement actions must proceed. In these situations the GAO has approved elimination of LCC factors from the evaluation.²²⁰ In such cases consideration should be given to conducting the needed investigation for future procurement actions involving the same or similar products.

Even where sufficient records are available, the time needed to compile adequate historical data may preclude use of this method in some procurements. Depending upon complexity, the time required to investigate and prepare an engineering estimate may also exceed that available under the procurement schedule. The contracting officer must obtain reasonable estimates of the time required to obtain the data in usable form prior to the evaluation of these methods.

Benchmarking will generally be subject to this consideration, especially where the needed tests are complex, involve failure or maintenance testing which require tests over a specified period of time, or require the testing of large numbers of items to demonstrate statistical significance. It is possible in such a case to

²²⁰53 Comp. Gen. 632 (1974).

THE EVALUATION PROCESS

consider a trade off between test accuracy and the time required to perform it. A less accurate test, if available, could be substituted and completed within an applicable time constraint.

b. The Cost/Benefit Tradeoff as an Element of Feasibility

For practical reasons applicability must include the concept of ignoring the insignificant. In the "applicability" phase factors were selected on the basis of potential dollar impact. Thus any life cycle cost which was expected to amount to a significant sum over the life of the item being procured was listed as an applicable life cycle cost factor. Consideration now must be given to quantifying the cost of using that factor in the solicitation. The major monetary tradeoff between a particular LCC factor's benefit and the cost of using it is the potential amount the government might save by use of the factor less the additional cost of including the factor in the contracting process. The latter factor must be measured against its cost in the procurement process and not and not related to the cost of the item being procured. Although the actual cost of including a particular life cycle factor in the evaluation process could, in a best case environment, be calculated, it seems more cost effective and in many cases as accurate to utilize reasonable estimates for evaluation of this amount.

THE EVALUATION PROCESS

In determining whether multiple awards, under a single procurement which allows such awards, may be most advantageous to the government the contracting officer is required to add \$250 (formerly \$100) to the multiple award total and compare that amount to the total under the best single award.²²¹ The \$250 represents an estimate of the added cost of administering the extra contracts being contemplated. By making such an adjustment the "real" potential benefit of multiple awards can then be evaluated. In effect this process is the application of a life cycle cost factor, administration expense, to the evaluation.²²²

Although admittedly more involved and subject to greater uncertainty, a similar procedure could be developed for considering the use of life cycle cost factors. Unlike the multiple award provision this evaluation would not become a part of the evaluation process itself. Rather it would be used solely as a way of determining whether estimates of potential LCC benefits are likely to warrant use of the LCC factor under consideration. As such the procedure would operate solely for the benefit of the government and would provide no substantive rights to bidders. The cost thresholds proposed in Figure 3-1 are admittedly raw

²²¹FAR § 14.407-5(c) (1984).

²²²As this adjustment is mandated in the procurement regulation there is adequate notice of this factor to bidders and need not be specified in each solicitation.

THE EVALUATION PROCESS

approximations based on engineering and administration rates used in calculating liquidated damage provisions. Undoubtedly further study could produce more representative numbers. Costs for the first factor requiring specific data is priced at a higher level to reflect initial expenses related to use of that particular data acquisition method. As a result it may be necessary to evaluate factors in different order to assure that a valid result is obtained. This could also be accomplished by averaging the total cost estimates for all factors in a given category. The source of the evaluation data is considered the critical factor contributing to the cost of using LCC factors.

THE EVALUATION PROCESS

Figure 3-1
Administrative Cost Estimates for LCC Use

Source of evaluation data (use amount from highest applicable source if more than one applies)	Initial LCC Factor	Subsequent Factors
Unverifiable contractor data.....	\$3,500	\$1,000
Preaward benchmarking.....	3,000*	1,000*
Verifiable contractor data.....	2,000*	500*
Government estimate.....	1,500*	1,000*
Available government data.....	900	750
Available third party data.....	250	100

* In cases where these costs can be estimated it may be desirable to substitute actual estimates for these figures.

THE EVALUATION PROCESS

In cases where available third party data is readily available (e.g. EPA fuel efficiencies) the costs merely reflect administrative expenses related to solicitation preparation and evaluation. Available government data will generally require some compilation and verification resulting in additional administration and some engineering expense. Preparation of a government estimate will often involve significant engineering time and expense. Verifiable contractor data covers situations where evaluation is based upon contractor data, however preaward benchmarking of the proposed awardee is conducted to verify the accuracy of the data submitted. Preaward benchmarking envisions the testing of all bidder products prior to award evaluation. Unverified contractor data is the situation where preaward verification is not possible and provision must be made for post-award contract adjustments should the item delivered fail to meet the representations made in the contractor's bid. This is considered the least desirable and most expensive scheme because it involves the potential for significant post-award controversy with resultant administration, engineering and legal expenses.

c. Reliability of Data

Care must be taken to insure that the life cycle cost data utilized in evaluating bids or proposals for award is sufficiently accurate to provide the basis of meaningful

THE EVALUATION PROCESS

differentiation between bidders, that is the calculations used establish a reasonable probability that one product's life cycle costs will prove to be cheaper than the next by approximately the amount indicated in the analysis. Perhaps life cycle costing is rejected more often because of the questionable accuracy of the needed data than for any other single reason except precedent. The Department of Defense has noted that while data of lower confidence may be used for certain purposes, "the greatest precision is required when the estimates are used as contractual commitments."²²³

1. Timing

Time plays a large part in the difficulty which is encountered in projecting meaningful life cycle cost estimates. In many cases it is possible to determine certain costs which will be encountered in a new procurement with great accuracy. However, the uncertainties of projecting these costs several years into the future requires special consideration. For example, current labor rates for maintenance technicians needed to service a given product are generally known, but it may be extremely difficult to project what those rates will be five or ten years from now, the time frame when actual service will be needed.

²²³ DOD Publication LCC-3, "Life Cycle Costing Guide For System Acquisitions (Interim)", Department of Defense, Washington, D.C., January 1973 at para. 4.3.

THE EVALUATION PROCESS

The Comptroller General has questioned the use of operating and maintenance costs which are subject to annual renegotiation in evaluating the life cycle costs of a product with an eight year useful life.²²⁴ In determining whether data of sufficient accuracy is available, consideration must be given to the likelihood of significantly different price growth between various bidders' downstream costs. The effects of general economy-wide inflation need not be evaluated if costs have been reduced to present dollars as this factor has been anticipated in the establishment of the present value discounting formula.²²⁵ The accuracy of the data to be used in a life cycle cost analysis which forms a part of an award determination must be considered from two aspects. These might be labeled the "Zone of uncertainty" and the "Sensitivity" tests. Were the results of a life cycle cost analysis of sufficient accuracy, the above described cost/benefit evaluation would be the only test necessary in determining the cost/benefit tradeoff. Unfortunately, few life cycle cost factors are susceptible of highly accurate calculation. Transportation costs, one of the few which is normally capable of accurate determination, has been mandated as a required life cycle cost factor without regard

²²⁴Eastman Kodak Company, Comp. Gen. Dec. B-194584, 79-2 CPD § 105 (1979).

²²⁵See OMB Circular A-94, "Discount Rates to be Used in Time-distributed Costs and Benefits", March 27, 1972.

THE EVALUATION PROCESS

to even cost/benefit analysis.²²⁶ The ability to measure the downstream impact of most life cycle cost factors, however, is quite variable.

11. Zone of uncertainty

In order to be of actual benefit in the award determination process the use of an life cycle cost factor must increase the likelihood that award will be made at the lowest ultimate cost to the government. A sufficiently uncertain LCC factor may actually decrease, rather than increase, this likelihood.

This concept is difficult to grasp but mathematically accurate. A test for this discriminator may be made by comparing the expected variance between the potential items which might be offered in response to the solicitation against the accuracy of the method to be used to evaluate the cost of each bid, each quantity being expressed as a dollar amount. If this uncertainty is predicted to exceed the variance more than 50 percent of the time then the use of the method will actually result in less certainty that award will be made at a lower cost to the government and should not be used. The appropriate equation can be crudely stated as indicating that the life cycle cost factor should be abandoned if the uncertainty (expressed as a percentage

²²⁶FAR § 14.407-5(a) (1984).

THE EVALUATION PROCESS

of the total factor estimate) is greater than 1.47^{227} (say 1.5) times the potential factor variance between bids (also expressed as a percentage of the total factor estimate). Unfortunately, both elements of this equation are usually quite illusive and in most cases the best which can be expected is that data accuracy will be subjectively examined. Any scheme which must rely upon data of such questionable accuracy that the result obtained will lack credibility should be rejected.

iii. Sensitivity

Sensitivity is concerned with the impact each component has with regard to the final calculation of an LCC factor. This impact is compared to the likely cost to be incurred based on such components. In cases where the components are all interrelated, as in the power consumption equation, no sensitivity problem can exist. That is, if the component is derived solely by multiplying components there can be no sensitivity issue. However, where components are added care must be exercised to ensure factors are composed of properly scaled elements.

²²⁷This constant assumes bid variance is distributed linearly throughout its range and that uncertainty follows a normal distribution curve. More complex equations can be developed but given the uncertainty with which the variables in this simplified equation can be estimated a more complicated expression is unlikely to produce more accurate estimate. See generally "Factors for Computing Probable Errors", CRC Standard Mathematical Tables, 14th Edition (1966), at 248.

THE EVALUATION PROCESS

Information International, Inc.,²²⁸ illustrates the problem. In that case the evaluation scheme established for use in the procurement of optical scanning equipment called for a benchmark testing of two operating factors, throughput and accuracy. The testing scheme utilized the same test deck for both evaluations. Due to the nature of the test materials throughput was measured with considerable accuracy, however, the accuracy measurement, performed by counting observable errors, was not so precise. In evaluating the components a dollar multiplier was applied for each error and another multiplier was assigned for each machine necessary to meet the agency's expected daily throughput requirement. The multipliers however, were selected so that the error rate created a significantly larger cost impact than was warranted by the probable cost of correcting errors. In short, one of the components of the factor bore an unrealistic weight when compared to the factor as a whole.

4. Data source selection

If more than one potential source of the needed data is feasible, or more than one option within a sourcing method exists a decision must be made. Of course, if one method is both more accurate and less costly than others it should be

²²⁸Comp. Gen. Dec. B-191013, 59 Comp. Gen. 640, 80-2 CPD § 100, aff'd on reconsideration,, 80-2 CPD § 246 (1980).

THE EVALUATION PROCESS

selected. More often a tradeoff between cost and accuracy must be made. The selection usually depends upon the nature of the procurement and the type of product being obtained. Large increases in cost for only a small increase in accuracy are seldom worthwhile. On the other hand the use of highly speculative data will encourage award protests and create greater uncertainty that the cost to the government has been effectively minimized.

Regarding the submarine communications solicitation, the contracting officer may determine that electrical rates will be measured by the current rate at each location where the contractor proposes to install transmitters. As the needed antenna is a new product it will be necessary to have the contractors provide, as part of their bids, the power rates transmitter/antenna combination will draw in use. Maintenance employee manhours might be based on the government's current cost of labor for technicians of the required skill level. Travel expenses will be based on third party data, the current price of commercial air travel from the location where the required government technicians are assigned to the proposed transmitter sites. Installation costs can be based on a government estimate of the cost of installing a transmitter of the type and size anticipated to meet the government's needs plus a transportation estimate based upon commercial rates for delivery charges using benchmarked weights and cubes for

THE EVALUATION PROCESS

each bidder's specified transmitter and guaranteed weights and cubes for the antenna.

B. UNANNOUNCED EVALUATION CRITERIA

As noted in Chapter III the Comptroller General has not required that a solicitation utilizing life cycle cost factors contain a detailed announcement of the specific criteria which will be used to establish each LCC factor or the precise mathematical method used to calculate each such factor.²²⁹ In discussing evaluation methods the Comptroller has noted:

The only requirements are that the method provide a rational basis for source selection and that the evaluation be conducted in good faith and in accordance with the announced evaluation criteria.²³⁰

The requirement that any evaluation conducted have a "rational basis" has already been discussed in some detail.²³¹ Dealing specifically with an LCC factor the GAO stated the test as one of "sound logic and fairness to all bidders" upholding the calculation of residual value as a

²²⁹Note, however, that the solicitation must provide bidders or offerors with sufficient information to evaluate the basis on which their products would be compared. See notes 159-63 and accompanying text, *supra*.

²³⁰Francis and Jackson, Associates, Comp. Gen. Dec. B-190023, 57 Comp. Gen. 244, 248, 78-1 CPD § 79 (1978) at 6.

²³¹See notes 181-92 and accompanying text, *supra*.

THE EVALUATION PROCESS

percentage of bid price.²³² Under either standard it appears that the procuring agency will be allowed broad discretion so long as the method utilized produces a reasonable estimate of the LCC factor being evaluated.

To the extent that evaluation criteria rationally measure the announced LCC factors and conform to any methods or criteria actually stated in the solicitation it appears that the only requirement is that the factor calculations be conducted in good faith. Although there have been allegations that a life cycle cost evaluation was conducted in bad faith,²³³ the GAO has never invalidated an award on this basis. Thus it is difficult to establish what a protestor would be required to show to establish such a

²³²Will J. Davis, Comp. Gen. Dec. B-171798(1), August 18, 1971, Unpub. In this case the Comptroller General appears to have placed great significance on the fact that "application of the percentage factor did not result in a competitive advantage to any one proposer." There appears to be no logical necessity for such a requirement so long as every component of the evaluation factor which provides advantage to one or more bidders is established in good faith and provides a good (though not necessarily the best) measure of a predictable post-acquisition cost to the government.

²³³See e.g., RMI, Inc., Comp. Gen. Dec. B-203652, 83-1 CPD 5423 (1983).

THE EVALUATION PROCESS

charge.²³⁴ The GAO has adopted the standard utilized by the Court of Claims in determining what constitutes a showing of bad faith.

In the cases where the court has considered allegations of bad faith, the necessary 'irrefragable proof'²³⁵ has been equated with evidence of some specific intent to injure the plaintiff.²³⁶

This standard has been specifically applied where there has been a claim of bad faith regarding evaluation procedures.²³⁷ Given the broad discretion allowed procuring agencies in the LCC area it is doubtful that any but the

²³⁴If the criteria used to calculate LCC factors was prepared prior to bid opening then a much greater showing would probably be required. It could be expected that in such a situation a protestor would be required to show that the procuring agency knew that a particular evaluation scheme would favor a particular bidder or class of bidders and determined to use that criteria for the express purpose of attempting to place that bidder or bidders in a favorable position unwarranted by the needs of the government. Where the evaluation criteria is not developed until after bid opening and the contracting officer and his staff have had an opportunity to examine all bids there is no need to require a showing of knowledge that a particular scheme would benefit a given bidder as the information submitted with the bid will clearly provide such insight.

²³⁵The requirement for "irrefragable proof" was announced in *Knotts v. United States*, 128 Ct. Cl. 489, 492, 121 F. Supp. 630, 631 (1954).

²³⁶*Kalvar Corp. Inc. v. United States*, 211 Ct.Cl. 192, 198-99, 543 F.2d 1298, 1302, cert. denied 434 U.S. 830 (1977)(emphasis in original).

²³⁷*RMI, Inc.*, Comp. Gen. Dec. B-203652, 83-1 CPD § 423 (1983).

THE EVALUATION PROCESS

most blatant case of favoritism would lead the Comptroller General to invalidate an award on this basis.

Although there is no case law to support the proposition it would appear that where evaluation criteria was prepared prior to bid opening and then altered after that time the agency should be required to make a showing that the change led to a more accurate evaluation or was needed to allow fair evaluation of bids. Otherwise the reviewing authority, the GAO or a court, might be justified in presuming an improper motive for the change.

C. ALTERATION OF ANNOUNCED EVALUATION CRITERIA

The Comptroller General has allowed little discretion in the alteration of announced solicitation criteria in the evaluation of a life cycle cost based contract award determination.

Although a contracting agency has broad discretion in determining the evaluation plan it will use, it does not have the discretion to announce one plan in the solicitation and then follow another plan in the actual evaluation. The agency must either follow the evaluation criteria specified, or advise all offerors of any significant changes in the evaluation scheme.²³⁸

"Significant changes" are apparently those which render the solicitation's information inadequate to advise offerors

²³⁸Dillon Supply Co., Comp. Gen. Dec. B-203937, 82-1, CPD § 41 (1982) at 4.

THE EVALUATION PROCESS

or bidders of the "manner in which proposals [or bids] were to be prepared" and that the change would have had an impact on a properly prepared offer or bid.²³⁹

In general, federal and most state procurement statutes or regulations require award evaluations to be conducted in accordance with the solicitation on which they are based.²⁴⁰ There is little reason or justification for deviation with regard to announced award factors which are susceptible to only minor variation. For example in considering the inclusion of a small business set-aside the contracting officer need be concerned with only two possibilities, either a bidder is or is not a small business. Life cycle costs factors are not always so easily anticipated nor categorized. There is a need, therefore, for some latitude in the evaluation of such factors.

With negotiated contracts this problem is not difficult. The initial RFP must state an evaluation method, including the LCC factors to be evaluated.²⁴¹ However, if the examination of proposals indicates that variances in offers renders that method impractical or undesirable the contracting agency is permitted to alter the evaluation

²³⁹See *Ridgeway Electronics, Inc., Comp. Gen. Dec. B-199557, 81-1 CPD § 21 (1981) at 6.*

²⁴⁰See e.g. FAR § 14.407-1(a)(3) (1984) (advertised procurement); FAR § 15.611(d) (1984) (negotiated procurement).

²⁴¹See *Dictaphone Corp., Comp. Gen. Dec. B-200765, 81-1 CPD § 475 (1981).*

THE EVALUATION PROCESS

scheme "if it informs all offerors of the change and provides them an opportunity to restructure their proposals in light of the new evaluation scheme."²⁴² This allows the procuring agency time to detect any flaws in the evaluation plan and make corrections without disruption to the procurement timetable. The difficulties discussed here involve situations where formal advertising was involved or the agency failed to allow offerors an opportunity to restructure their proposal prior to application of the revised evaluation plan, and the government desires to use a means of evaluating bids or offers for award different from that indicated to bidders in the solicitation or other communications to all bidders or offerors²⁴³ made prior to bid opening or the receipt of best and final offers. To the extent that the government wishes to calculate the LCC evaluation factors by means which are not inconsistent with the announced criteria it may do so subject to the concerns discussed in the following section.

²⁴²Galler Associates, Inc., Comp. Gen. Dec. B-210204, 83-1 CPD § 515 (1983).

²⁴³The government's duty to inform bidders of the evaluation criteria need not be made solely by way of the solicitation or amendments thereto, rather any official communication which places actual evaluation information in the hands of all bidders will suffice. Neshaminy Valley Information Processing, Inc., Comp. Gen. Dec. B-201336, 81-2 CPD § 52 (1981). However, such communications are a two edged sword and may also bind a procuring agency to the evaluation mechanism communicated to bidders outside the solicitation. See United Computing Systems, Inc., Comp. Gen. Dec. B-192298, 79-2 CPD § 8 (1979).

THE EVALUATION PROCESS

1. New Factors

In a small number of cases a review of the bids indicates that a life cycle cost factor which was not expected to be significant is, in fact critical to fair comparison of the bids. This can occur when a prospective offeror's product has obvious life cycle cost advantages which the government now wishes to consider. The possibility of a large disadvantage which is not in the established evaluation criteria is also of concern because of the possibility that the government may have to cancel the solicitation rather than award to a bid which is low under the established evaluation criteria but which is clearly not low based upon the application of a reasonable life cycle cost evaluation.

Consider a contract for the purchase of emergency lighting batteries. One bidder, with a new battery formulation, is low by a considerable amount, however, benchmark testing performed to insure minimum battery life shows that voltage fluctuations from the new battery cause the light's bulb to fail after only 10 hours of use as opposed to the 100 hour life experienced with typical wet cell batteries. If the cost of the replacement bulbs, which would be needed during the life of each battery, is added to price the bid based on the new battery is four times that of

THE EVALUATION PROCESS

the "next low" bidder. Bulb replacement was not an announced award evaluation criteria because previous bids had always been based upon supplying wet cells all of which had exhibited similar bulb life experience. Can the factor now be considered for award?

The answer is no. The Comptroller has held that life cycle cost factors not contemplated in the solicitation may not be considered.²⁴⁴ One case has held that a solicitation provision providing for award based upon "price and other factor" placed bidders on notice that transportation costs would be considered.²⁴⁵ Such a holding would appear to open the door for the consideration of many "other factors" without their explicit inclusion in the solicitation. However a subsequent case has made it clear that transportation costs may be considered despite the failure of the solicitation to so indicate only because of the regulatory provision requiring their consideration thus satisfying the notice requirement.²⁴⁶

²⁴⁴Steward & Stevenson Services, Inc., Comp. Gen. Dec. b-215899, 84-2 CPD § 173 (1984)(prompt payment discounts); MAC Services, Ltd., Comp. Gen. Dec. B-203818, 82-1 CPD § 46 (1982)(depreciation and opportunity costs); Xerox Corp., Comp. Gen. Dec. B-180341, 74-1 CPD § 242 (1974)(residual value & program conversion costs).

²⁴⁵Sayles Biltmore Bleacheries, Inc., Comp. Gen. Dec. B-185262, 76-2 CPD § 53 (1976).

²⁴⁶Delphi Industries Inc., Comp. Gen. Dec. B-194802, 79-2 CPD § 239 (1979).

THE EVALUATION PROCESS

In general it is desirable to have potential bidders aware of those life cycle cost factors which the government considers significant enough to include in the award evaluation. To the extent that allowing inclusion of new factors after bid submission undermines the confidence that a bidder's product will be evaluated as indicated the benefit appears to outweigh those limited circumstances where the government may have to resolicit the requirement in order to protect the overall fairness of the procurement process or to protect itself from an uneconomical award.

2. Changes of announced calculation methods

In cases where the solicitation provides detailed information on the method to be used in calculating the LCC factors specified in the solicitation, the contracting officer has little discretion in altering the specified calculation criteria, as bidders or offerors may have relied on this information in preparing their response to the solicitation. The Comptroller General has, however, allowed changes in evaluation calculations where necessary to insure a fair evaluation of the bids received. Just as need sometimes arises for consideration of new factors, situations may arise where a the method of evaluating a factor must be changed or the factor eliminated entirely. Such circumstances are rare. Even in cases where adherence to the originally stated method of evaluation will

THE EVALUATION PROCESS

definitely lead to award to other than the low bidder the Comptroller has refused to allow substantive changes.²⁴⁷ Thus, more than economic interest is required to allow alteration of the evaluation scheme after closing.

In Gary Aircraft Corporation; National Fleet Supply, Inc.,²⁴⁸ the solicitation provided government transportation costs from bidder's plant to the place of need were to be added to each bid. The low bid indicated all transportation charges would be paid by the seller and the agency did not add the transportation costs to the bid. A protest that the solicitation required addition of the transportation charges notwithstanding the fact that the government would not be required to bear them was denied. In Leon Whitney²⁴⁹ a request for proposal (RFP) provided for additional award evaluation points to be added to each offer which included an effective program to reduce trips in excess of 250 miles under the contract. The location of the protestor's business was such that no trip over 250 miles would be necessary during contract performance and he failed to submit a plan. The Comptroller General held the agency erred in not granting the maximum number of points on this

²⁴⁷E.g. Northeast Construction Co., Comp. Gen. Dec. B-205246, 82-1 CPD § 293 (1982); The Ellinor Corporation, Comp. Gen. Dec. B-182384, 75-1 CPD § 254 (1975).

²⁴⁸Comp. Gen. Dec. B-193793, 79-2 CPD § 104 (1979).

²⁴⁹Comp. Gen. Dec. B-190792, 78-2 CPD § 420 (1978).

THE EVALUATION PROCESS

item as award to Whitney would insure the maximum benefit anticipated from the evaluation factor.

In evaluating a particular bid the contracting officer must be prepared to alter or eliminate the calculation of a life cycle cost factor to insure that bidders or offerors are evaluated on a equal basis. These cases appear to indicate that the contracting officer may, and in fact must, recognize economic reality above mere mechanical application of formulas contained in a solicitation.

In evaluating when economic reality requires evaluation calculation adjustments the contracting officer should look to the cost impact on the government and not the the effect of the announced criteria on the positions of the bidders or offerors. Thus it is appropriate to include conversion costs on all bidders offering systems which are incompatible with existing equipment even though such criteria gives a significant advantage to the incumbent.²⁵⁰

The need to adjust the bid evaluation process may also occur when a solicitation was unclear as to costs to be included in particular bid items and bidders, in effect, bid particular items on different bases. In CompuServe²⁵¹ the GAO held that a life cycle cost analysis is inconclusive in

²⁵⁰Dillon Supply Co., Comp. Gen. Dec. B-203937, 82-1 CPD § 41 (1982).

²⁵¹Comp. Gen. Dec. B-204932, 82-2 CPD § 33 (1982). •

THE EVALUATION PROCESS

such a situation and unless bids or offers are adjusted to account for variances in what the various bids included within a given item an award based on such an analysis is defective.²⁵² Although no case has yet reached such a result, the CompuServe theory could support total elimination of a life cycle cost factor where the nature of the solicitation responses preclude any meaningful consideration of that factor. Given the Comptroller General's concern for protecting bidders and offerors' reasonable reliance on the announced evaluation criteria it would appear that such a result would be allowed only if the LCC factor's magnitude was small in comparison to the overall evaluation's composite cost. The Comptroller would probably favor cancellation and resolicitation where the factor excluded from consideration could have been anticipated by bidders or offerors to be a significant part of the evaluation.

Although probably not required, the contracting officer may adjust costs to reflect the most cost effective method of satisfying a life cycle cost constraint. Thus in Hasko-Air, Inc.,²⁵³ manufacturer's maintenance requirements for an aircraft engine modification kit specified inspection and repair after each 500 hours of operation. The procuring

²⁵²See also C. L. Systems, Inc., Comp. Gen. Dec. B-197123, 80-1 CPD ¶ 448 (1980)(maintenance).

²⁵³Comp. Gen. Dec. B-192488, 79-1 CPD ¶ 190 (1979).

THE EVALUATION PROCESS

agency determined that it would be more practical and cost effective to perform this task at a regularly scheduled 400 hour inspection. The GAO upheld this adjustment despite the fact that application of the 500 hour time frame would have resulted in a lower apparent cost to maintain the protestor's modification kit under the specific evaluation scheme being employed.

Heakog Air demonstrates the need for and benefit of allowing procurement officers to make "technical" adjustments to the application of the life cycle cost evaluation criteria where practical considerations dictate. Had the 400 hour substitution not have been permitted the award decision might have been altered, however, the using agency would probably still have adopted the 400 maintenance cycle to minimize actual costs (as opposed to the expected costs as calculated under the award evaluation scheme). The lowest ultimate cost to the government would not have been obtained due to the absence of sufficient flexibility in the evaluation phase.

It appears that a change will be justified only to insure each bidder receives fair consideration of their bid. A change needed to reflect changes in the government's needs or to more accurately reflect the actual procurement situation is not permissible. Thus in United Computing

THE EVALUATION PROCESS

Systems, Inc.²⁵⁴ the General Accounting Office held that a change in government funding which would preclude obtaining contract services for a period greater than 14 months did not justify a change in the system life as used for award evaluation from the announced 36 months to 14 months. The requirement to afford offerors an opportunity to adjust their proposals outweighed the benefits of allowing immediate evaluation based on the altered conditions.

The actual degree of discretion and standard for review in making changes to allow for a proper comparison are not yet fully ascertainable for Comptroller General decisions. The best reading of the limited caselaw appears to indicate that changes in announced method of factor calculation for this purpose will be permitted only if:

- 1) the changes made alter only the mechanics of the LCC factor's measurement and not the breadth or reach of the factor itself;
- 2) the change is necessary to allow an evenhanded comparison of all bids or offers received; and
- 3) the method of calculation as changed provides for a fair comparison of all bids or offers.

The cases allowing evaluation adjustments after closing can be distinguished from those denying the use of new factors. In each of the former bidders were on notice that

²⁵⁴Comp. Gen. Dec. B-192298, 79-2 CPD § 8 (1979).

THE EVALUATION PROCESS

particular life cycle factors would be considered and the adjustments were necessary and permissible only to allow fair comparison of the bids and offers. In such situations bidder and offeror's products are still being evaluated on the basis of the same characteristics which were made known in the solicitation. Presumably if their products are actually superior regarding a given factor, the new evaluation technique will also demonstrate that fact.

5. Mathematical changes

Even if amounts are stated precisely in the solicitation were mathematical changes or corrections in evaluation calculation techniques are permissible. In Deterline Corporation²⁵⁵ the evaluation criteria provided for the addition of travel costs based upon an government estimate which anticipated acquisition of a given number of items. The government reduced the number of items to be purchased prior to bid opening, however, it neglected to notify bidders of any change in estimated travel costs. In making the evaluation the government reduced the travel cost factor in accordance with the reduction in units purchased. GAO affirmed the contract award finding that the reduction in quantity worked a de facto reduction in the travel estimate since the government had originally established the estimate on a per unit basis, despite the fact that the per

²⁵⁵Comp. Gen. Dec. B-208986, 83-1 CPD § 427 (1983).

THE EVALUATION PROCESS

unit basis of the factor's calculation was apparently not disclosed in the solicitation. Such a decision can probably be justified on the grounds that bidders should have realized that a reduction in units to be purchased would result in lower travel costs and should have anticipated an adjustment in the evaluation factor. As the notice of reduced quantity came prior to bid closing the needed opportunity to change bids was present.

4. Rules in making evaluation changes after closing

As yet the case law has failed to establish with certainty the limits within which changes can be made to an established life cycle cost evaluation after the receipt of bids and offers. This is primarily do to the lack of specificity solicitations have generally shown in outlining the criteria. If, as appears possible, the Comptroller General moves toward requiring greater pre-closing notice of evaluation criteria, more cases might be expected to deal with this issue. Although never formally stated, the Comptroller General appears to be establishing three rules of general application:

1. Factors concerning which bidders have had no opportunity to adapt their bid are not permitted.
2. The determination of LCC factors must be individually adjusted where necessary to allow comparison of bids on the basis of equal cost/benefit to the government.

THE EVALUATION PROCESS

3. The calculation of announced LCC factors may be altered if, but only if, the change is not inconsistent with the established evaluation scheme and (i) bidders could have anticipated the change from information supplied prior to bid opening, or (ii) the alteration was required by variations in the solicitation responses and is necessary to allow fair comparison of the bids or offers.

In light of the latitude currently enjoyed by agencies in determining the use of life cycle cost factors and their ability to satisfy the notice requirement without a detailed statement of the evaluation determination equation these rules appear appropriate and workable. However, should the GAO move further toward requiring specific and concrete evaluation equations for each LCC factor in the solicitation the resultant lack of discretion on the part of the contracting officer to change the evaluation when conditions dictate may create problems. Numerous solicitation cancellations could result from failure of the government to be in a position to make a beneficial award under the announced criteria, which in turn could reduce the willingness of procuring agencies to utilize life cycle costing to the extent feasible.

D. EVALUATION PITFALLS

Provided the actual evaluation method is in accordance with all announced criteria the Comptroller General has

THE EVALUATION PROCESS

granted the widest discretion to procuring agencies in developing evaluation schemes. Errors in the evaluation process continue to result in invalidation of awards or troublesome protests, most often due to simple errors in mathematics²⁵⁶ or lapses in the logical application of the factor criteria to the available data.²⁵⁷ Such errors are generally the result of complex factor formulas,²⁵⁸ inadequate consideration of the factor's practical impact on life time costs or misapplication of data accumulation techniques. Each such case is fact determinative and little would be gained in their detailed discussion. Further in such situations a new evaluation may correct legitimate errors brought to the procuring agency's attention in a protest.²⁵⁹ Four generalized problems do, however, warrant discussion.

1. Alternate bids or offers

Where funding constraints prevent award of a contract at the lowest life cycle cost under a multi-option

²⁵⁶See e.g., C3, Inc., Comp. Gen. Dec. B-206881, 82-1 CPD § 461 (1982).

²⁵⁷See e.g., C. L. Systems, Inc., Comp. Gen. Dec. B-197123, 80-1 CPD § 448 (1980); 51 Comp. Gen. 102 (1971); Coastal States Petrochemical Co., Comp. Gen. Dec. B-168570, June 19, 1970, Unpub.

²⁵⁸See e.g., 52 Comp. Gen. 614 (1973).

²⁵⁹See e.g., Western Division Investments, Comp. Dec. B-213882, September 5, 1984, 84-2 CPD § ___; C3, Inc., Comp. Gen. Dec. B-206881, 82-1 CPD § 461 (1982); Coastal States Petrochemical Co., Comp. Gen. Dec. B-168570, June 19, 1970, Unpub.

THE EVALUATION PROCESS

procurement the Comptroller General has allowed award to be made to the lowest bidder under an option for which funds are available. Funding is a key consideration in the evaluation of any situation where the procuring agency has requested or required bidders to offer goods or services with two or more options with variable means of performance or ownership provisions. Such options generally entail tradeoffs between ownership options, such as a straight purchase, where initial costs are high but post acquisition costs are low, and others with low initial costs but higher recurring costs during the system life, for example a fixed term rental. Although the use of life cycle costing allows a dollar and cents comparison of such alternatives, funding constraints may not permit a procuring agency from exercising an option which requires acquisition expenditures in excess of a specified amount regardless of the ultimate benefit to the government.

In Interscience Systems, Inc. the solicitation requested that offerors give a price for each of four possible methods of acquisition (MOA): purchase, lease with option to purchase, lease with ownership transfer upon final payment and straight rental, and provided for award based on "the lowest (present value discounted) systems life cost, price and other factors considered ... subject to the

THE EVALUATION PROCESS

availability of funds for the proposed MOA."²⁶⁰ The lowest evaluated life cycle cost was Interscience's lease with purchase option proposal, its straight purchase plan was evaluated as the next most cost effective option, however award was made to another concern which had the lowest proposal on a straight rental basis. This decision was based on a determination that purchase funds were not currently available nor were they expected to become available during the time frame in which the purchase option could be exercised. Although upholding the award the Comptroller General indicated that:

where a solicitation requests offers on a basis that would necessitate the future availability of funds in order for that offer to be selected, a reasonable investigation into the expectation of the availability of such funds should be made before offers are solicited, if otherwise practicable.²⁶¹

While the decision fails to state what use should be made of this information, once obtained it would appear that the intent of the decision was that ownership options be solicited only in cases where a reasonable possibility exists that the options specified in the solicitation could be exercised if found to be low. Mere notice that funding limitations may effect award is apparently insufficient as that step was taken in the instant case and the Comptroller

²⁶⁰Comp. Gen. Dec. B-199918.2, 81-1 CPD § 222 (1981) at 1-2.

²⁶¹Id. at 7.

THE EVALUATION PROCESS

General still found the agency's methods warranted criticism.

Undoubtedly this criticism is based on the belief that awards to other than the low bidder, while necessary on occasion, reflect unfavorably on the government's procurement process. Nonetheless the decision appears questionable. The burden of preparing alternate proposals or bids will normally be slight as the majority of the data needed to do so will be available for the basic bid or offer. Further government funding is normally in a state of considerable flux and the fact that funds may or may not appear likely to become available prior to solicitation preparation is often only slightly indicative of whether funds could actually be obtained at the time of award, particularly if a purchase option appeared greatly superior to a rental situation. Thus the recommendation that presolicitation funding investigations be conducted appears more likely to undermine the government's ability to obtain the best price while adding little to the overall integrity of the procurement process.

The GAO faced the opposite situation in A. B. Dick Co.²⁶² There proposals were solicited on the basis of the same four ownership options present in Interscience. Award was made on the basis of a lease with option to purchase

²⁶²Comp. Gen. Dec. B-211119.3, 83-2 CPD § 360 (1983).

THE EVALUATION PROCESS

despite a lower price and straight rental offer from the protestor and agency knowledge that funds were not available at the time of award. The Comptroller upheld the award noting:

the contracting officer made a business judgement that an option to purchase could result in substantial savings to the Government if funding for the purchase became available during a lengthy contract period.²⁶³

The key in this case appeared to be that the option could be exercised at any time over a four year period and government funding uncertainty made it impossible to anticipate with any reasonable accuracy whether funds would, in fact, become available within that period.

Where a reasonable determination of funding possibilities can be made at the time of award the award decision should be based on the most likely eventuality. In general a lease with purchase option will be more expensive than a straight lease unless the purchase option is exercised. This additional expense is not warranted, no matter what the potential savings from exercise of the option, if no reasonable possibility of funding to allow exercise of the purchase option exists. On the other hand, where a option will extend beyond the period where reasonable predictions are possible a better approach is to weigh the magnitude of the potential savings against the

²⁶³Id., at 5 (emphasis added).

THE EVALUATION PROCESS

likelihood that such savings will eventually generate sufficient interest at an agency level where funding can be obtained.

2. Discretionary factors

Occasionally a solicitation in a formally advertised procurement is issued which appears to establish an LCC award factor in the evaluation which the procuring agency either did not perceive as such a factor or never intended to evaluate in more than the broadest subjective manner. As life cycle costing becomes more prevalent in government contracting agencies will have to use care in insuring that such factors are either clearly denoted in the solicitation as non-LCC factors subject to limited evaluation or be prepared to conduct an effective LCC evaluation of the factor's impact on post acquisition costs.

Comp. Gen. Dec. B-170675²⁶⁴ is an excellent example of this problem. The General Services Administration issued a solicitation for construction of a building requiring bidders to submit prices based upon an 870 day and 1095 day completion schedule. One bidder submitted the lowest overall bid based upon the longer schedule. Another bidder, however, was low on the short schedule, his bid being approximately \$500,000 more than the overall low. This bidder protested GSA's proposal to award to the low bid on

²⁶⁴51 Comp. Gen. 641 (1972).

THE EVALUATION PROCESS

the long schedule claiming that, considering either the cost of continued rental of space for the proposed government occupants of the building or the rate specified in the solicitation for daily liquidated damages for failure to deliver on time, early completion under its bid would save more than the difference between its bid and that of the proposed awardee.

It is clear that GSA never intended to do more than "eyeball" the bids and see if the difference in bids would be small enough to subjectively justify early completion. In answer to the protest GSA lamely claimed that the actual level of savings was speculative and liquidated damage rates were not an appropriate measure of the actual cost of nonoccupancy to the government.²⁶⁵

In denying the protest GAO either missed or ignored the salient issue, finding the actual benefit from a 225 day "acceleration" was speculative and that liquidated damages "are inappropriate as a measure of bid evaluation in view of

²⁶⁵This argument found the government claiming that its own specified liquidated damage rate was too high and not reasonably related to the government's actual damages as required by Armed Services Procurement Regulation (ASPR) § 1-310 (1975) (now FAR § 12.2). This argument would, therefore, appear to have negated the validity of the provision for later damage assessment. See TAMAR Electronics Inc., FAA CAP No. 66-14, 65-2 BCA § 5267.

THE EVALUATION PROCESS

the uncertainty in projecting the timeliness of future contract performance and delivery."²⁶⁶

The award should have been invalidated not because the bidder with the lowest ultimate cost to the government did not receive the award but because the evaluation procedure as implemented allowed the procuring agency to award without objectively evaluating an LCC cost factor which bidders could and should have reasonably anticipated would be evaluated. In fact the agency's own position, that the factor was too speculative to be evaluated, indicated that the solicitation was defective and should, therefore, have been cancelled! Perhaps the result can be partially explained based on the historic lack of LCC factors in construction contract evaluation procedures and that contractors might not have anticipated or relied upon a full blown LCC evaluation of the scheduling factor. Nevertheless procuring agencies must be sensitive to the possibility that bidders will view solicitation provisions as establishing unintended LCC factors. Recent cases dealing with alternate ownership methods (e.g. lease verse purchase) tend to indicate that inclusion of such bidding options place a

²⁶⁶51 Comp. Gen. at 650. Note that had the agency elected to award to a firm on the shorter schedule whose bid was less than the low bid on the long schedule plus 225 days worth of liquidated damages a situation would exist where the awardee could fail to complete until the 1095th day and still receive more than the low bidder on the long schedule. The basis under which GAO upheld the award would appear to allow this undesirable situation.

THE EVALUATION PROCESS

burden on the agency to make a reasonable evaluation of the actual lowest overall cost to the government.²⁶⁷ At least, such solicitations should clearly indicate that a "pure" cost/benefit analysis will not necessarily be applied.

3. Technical evaluation v. Life cycle costing

A similar problem can occur in negotiated contracts where the solicitation does not make clear whether a factor is to be considered part of the technical evaluation or an actual life cycle cost factor. It is, of course, possible to include consideration of post-acquisition costs as a technical matter. Clearly, products which have been engineered to achieve low fuel consumption for example may be considered technically superior to other similar items. Thus such factors may legitimately be part of a technical evaluation.²⁶⁸ However, there may be a decided difference in how an evaluation is handled depending on the characterization of such a factor. If a post acquisition cost consideration is treated as a technical factor the solicitation need only specify the relative weight (or order of importance) of the factor.²⁶⁹ This weight may or may not have any discernible dollar and cents relation to the price

²⁶⁷Interscience Systems, Inc., Comp. Gen. Dec. B-199918.2, 81-1 CPD § 222 (1981).

²⁶⁸Kaman Aerospace Corp., Comp. Gen. Dec. B-209220, 83-1 CPD § 667 (1983).

²⁶⁹50 Comp. Gen. 447 (1970).

THE EVALUATION PROCESS

of the contract and the cost impact of the factor's evaluation. If, on the other hand, the item is to be treated as a "real" LCC factor its relative importance need not be stated since it will ultimately be evaluated in terms of dollars and cents and its relationship to contract price directly determined. Perhaps the best determinate in this matter is whether the consideration of the factor is based solely on cost avoidance grounds (in which case full LCC analysis would be preferable) or is at least partially needed to assure that the product meets the government's needs.²⁷⁰ In any given circumstances either approach may be appropriate. The major point to be taken here is that contracting agencies may avoid protests alleging failure to properly advise offerors of the evaluation criteria by carefully explaining in the solicitation or during negotiations which of the two approaches is to be taken.

4. Gamesmanship

In advertised procurements with complex LCC factors the contracting officer must be concerned with the possibility that bidders will be able to manipulate the evaluation process to achieve unwarranted advantage. The potential for such problems is demonstrated by the solicitation reviewed in Will J. Davis.²⁷¹ That solicitation provided for bid

²⁷⁰See the discussion of this dichotomy at pages 23-24, supra.

²⁷¹Comp. Gen. Dec. B-171798(1), August 18, 1971, Unpub.

THE EVALUATION PROCESS

evaluation based on reductions for prompt payment discounts and residual value, which was to be calculated at 43% of the base purchase price, before discounting. Although there was no problem in the actual bids received, the bidding in this case could easily have been "gamed." Consider a bidder who makes a price of \$100,000 on the item offered. Under the Davis criteria a "straight" bid would be evaluated at \$55,000. Consider, however, a bid of \$200,000 offered with a 40% prompt payment discount. The bidder will receive \$120,000, but his evaluated bid will be only \$14,000. Discrepancies of this magnitude might be adjusted under the previously discussed GAO requirement that bids be adjusted to allow fair comparison of bids. However, shrewd bidders would still be inclined to offer large, if not absurd, discounts and enlarged prices, thereby defeating the validity of the 43% residual value factor since the actual bid price would not be the real value of the item being purchased. The GAO has condemned such a situation as an

evaluation deficiency [which] allows one vendor to increase his competitive advantage and simultaneously penalize the competitive advantage of the other vendors by arithmetic gamesmanship....²⁷²

Such an opportunity is limited to evaluation criteria and methods of which bidders become aware, through the solicitation, authorized bidder information releases or

²⁷²Storage Technology Corp., Comp. Gen. Dec.B-175365, June 19, 1972, Unpub.

THE EVALUATION PROCESS

unauthorized communication with government personnel, prior to bid opening. Therefore, to insuring that this problem does not plague a given procurement the contracting officer must carefully analysis the solicitation and any other evaluation criteria which are released or might inadvertently have become know to bidders to detect any potential opportunities for "gamesmanship."

CHAPTER V.

POST AWARD REMEDIES

In cases where the government has relied on contractor furnished data in making an award evaluation mechanisms must be found to ensure that the product supplied actually meets the representations made by the contractor. As stated in DOD life cycle cost guidance:

LCC awards will be made in large part on the basis of competing offerors' unverified claims. Offerors must be encouraged to submit realistic proposals with attainable objectives. Moreover, it is essential that the Government be protected in the event that the manufacturer's product selected for award ... fails to perform or meet the LCC proposed by the contractor.²⁷³

The use of contract adjustment mechanisms which operate after award of a contract adds significantly to the complexity of both the contract formation process, where the mechanisms must be developed and reduced to contract provisions, and contract administration, where they must be enforced. Their use should, therefore, be limited to situations where the benefits of use outweigh these increased administrative costs. The principle need for such mechanisms is in evaluations which use contractor data which cannot or will not be verified prior to award. To the

²⁷³DOD Publication LCC-1, "Life Cycle Costing Procurement Guide (Interim)", Department of Defense, Washington, D.C., July 1970, at para. 12-6.

POST AWARD REMEDIES

extent that the data necessary to evaluate the life cycle cost factors to be considered in an evaluation process comes from third party data or the government, via experience, estimate or benchmark testing this protection is unnecessary and need not be considered. However, as soon as a single component calculation is to be based upon contractor provided information which the government will not verify prior to award all the considerations discussed in this chapter apply.²⁷⁴

Two principle means exist which can be used to remove any incentive for bidders or offerors to provide data which is not representative of their product, price adjustment clauses and warranties. In most cases the preferred method to be used with a given piece of information will be dictated by the point in time when the contractor's information can be verified.

A. PRICE ADJUSTMENTS

The most commonly used and often preferable method of providing the needed protection is the inclusion of contract

²⁷⁴However the fact that an LCC factor is tested for evaluation purposes does not indicate that a post award remedy is unnecessary for there may be need for a provision in which the contractor warrants that the actual production goods will meet the results of the benchmark test or that the goods will operate at the measured level for a specified time period. See Williams & Lane, Inc., Comp. Gen. Dec. B-203233, 82-1 CPD § 21 (1982).

POST AWARD REMEDIES

provisions, which contain detailed terms for adjustment of the contract price if actual life cycle costs fail to track the contractor data upon which award was based. Representative of this mechanism and its most often based form is the Guaranteed Maximum Weight Clause included in most supply contracts where delivery will be F.O.B. manufacturer's plant.²⁷⁵ This clause asks bidders to provide information regarding the size of product shipping containers and their weight in addition to other pertinent transportation information. Transportation costs to the government are then estimated based on this data and included in evaluation of the procurement. Upon actual delivery if the awardee's goods do not conform to the supplied data and the government suffers as a result the price is reduced based upon the clause's price adjustment provisions. Each such price adjustment clause must contain a verification mechanism and a price reduction formula.

1. Verification

In order to ensure that the contractor supplied data upon which the award evaluation turned was accurate, the actual product condition or attribute which was estimated based on that data must be determined. Price reductions can be effectively made only while the government retains at least a portion of the contract price from which the

²⁷⁵FAR § 52.247-60 (1984).

POST AWARD REMEDIES

reduction can be made. Thus any data subject to price adjustment provisions must be verifiable prior to final payment under the contract. This is both the principle requirement and limitation on the use of price adjustments. The use of price adjustments with respect to any particular life cycle cost factor will depend on the ability of the contracting officer to develop an acceptable way to check the contractor data upon or shortly after delivery. In the case of guaranteed shipping information this task is easy. The size of the packed product and its weight can be physically measured at the time of delivery or upon arrival at the government destination.

The technique of post-award testing of performance criteria is a common one. It is feasible for those procurements in which delivery is made over an extended period of time or in which the testing period is short enough to be completed prior to final payment.²⁷⁶

Criteria which depend on physical properties of the procured item or can be measured instantaneously (e.g. light bulb brightness, engine power) are easily verified by post award testing. Other performance criteria are more difficult and sometime impossible to determine within the time constraints imposed by the need to make final payment within a reasonable time after delivery. Failure rates, frequency of repair, deterioration-in-use rates and shelf

²⁷⁶DOD Publication LCC-2, "Casebook Life Cycle Costing in Equipment Procurement", Department of Defense, Washington, D.C., July 1970 at Case 3, page 36.

POST AWARD REMEDIES

life are all frequently important in the evaluation of life cycle costs. As noted in the quote sometimes it is possible to test first articles or the initial production items if production schedules provide for a lengthy contract run. The performance of factors which normally occur over significant periods of time can sometimes be simulated in tests which accelerate the causes of condition for which the test is performed.²⁷⁷ In many cases however, no accurate method exists for the evaluation of a critical factor except the passage of time (e.g. effects of sunlight on exterior paint) or actual use of the product in the field (e.g. seat belts in automobiles). Where the time needed for such testing is not available warranty provisions must be utilized, another method found to acquire the data or use of the LCC factor requiring the contractor furnished data must be abandon.

2. The price adjustment formula

Use of a price adjustment clause requires the development of a formula for the calculation of the price adjustment which will be made if actual capability is short of the contractor's representations. This provision is crucial to effectively deter bidders from intentionally

²⁷⁷See e.g. Remington Rand Corporation, Comp. Gen. Dec. B-204084, 82-1 CPD § 408 (1982) (use of mechanical keystriker to measure typewriter key failure). Note, however, that such tests may not adequately establish performance capabilities over the full life span of the product.

POST AWARD REMEDIES

skewing their life cycle cost data to obtain competitive advantage in the award process. All post award mechanisms must adequately consider the need to both protect the integrity of the procurement process and insulate the government from the cost impact of failure to attain the LCC goals represented in the awardee's bid or offer. The selection of the cost reduction formula to achieve these purposes requires considerable care. The problem is well illustrated by the commonly used transportation price adjustment scheme.

Although both the Department of Defense and civilian agencies utilized similar guaranteed shipping weight clause, prior to promulgation of the FAR the actual price adjustment clause used under the Defense Acquisition Regulation (DAR) and Federal Procurement Regulation (FPR) were different. DAR § 7-2003.16 provided that if the item exceeded the weight or cube guarantee the price would be reduced by an amount equal to the difference between the transportation costs computed for bid evaluation purposes and the costs which should have been used for bid evaluation based on the actual weight. FPR § 1-19.202-3, however, provided for the adjustment to equal the actual cost to the government due to the excess weight. The FPR clause, while appearing to protect the government from additional costs, has been criticized because:

POST AWARD REMEDIES

the advantage to the bidder from underestimating shipping weights is not necessarily equalized. A bidder could underestimate his shipping weight and gamble that the actual shipping costs would be less than the shipping costs used for evaluation purposes.²⁷⁸

In fact this scheme not only allows contractor manipulation of the bidding process but can actually cost the government money.

Consider a procurement in which Bidders A and B operate two competing appliance manufacturers next door to each other. The General Services Administration solicits bids for 5000 hot water heaters F.O.B. at the rail head nearest manufacturer's plant. This location is the same for both A and B and therefore the government's costs are the same for each. The solicitation requires each bidder to state a shipping weight and cube for each item stating transportation costs will be added to each bid based on the smallest number of standard box cars needed to accommodate the units. Bidder A bids "straight" at \$90.00 per heater. His unit specifications yield a need for 11 box cars and the government adds the cost per car, currently \$3,800, times 11 to his evaluated bid making a total of \$491,800, \$41,800 for transportation and \$450,000 for the product. Bidder B's heaters will also require 11 standard boxcars, however, B,

²⁷⁸Nash and Cibinic, Federal Procurement Law, Vol. 1, George Washington University, 1977 at page 293-94.

POST AWARD REMEDIES

anticipating that more economical oversize boxcars may be available when the heaters are actually shipped, bids his heaters at \$95.00 but supplies weights and cubes calling for a single boxcar. Although unrealistic the Comptroller General has allowed such bidding²⁷⁹ and the government, expecting to be fully protected, has no reason to question it. Thus B's evaluated bid is \$478,800, \$3,800 for transportation and \$475,000 for the product. In fact oversize cars are available and the actual transportation cost is \$23,800. B's price is reduced by \$20,000 and he receives \$455,000. The total cost to the government is \$473,800 or \$5,000 more than the cost under A's bid.

The FPR formula does offer some "protection" from increased costs of transportation, but that is not what it was designed to do. Actual transportation expenses as a component of the transportation LCC factor are based on third party data, commercial rail tariffs and purchasing F.O.B. origin is designed to place the burden of transportation costs, including increases on the government. If the government actually desires to shift this burden to the contractor it would be better served to use an F.O.B. destination solicitation.²⁸⁰ The DAR § 7-2003.16 approach works well for transportation costs since it negates any

²⁷⁹Drexel Contract Furniture, Comp. Gen. Dec. B-180598, 74-1 CPD § 324 (1974).

²⁸⁰Cf. Browne & Bryan Lumber Co., Comp. Gen. Dec. B-172531, 75-1 CPD § 39 (1975).

POST AWARD REMEDIES

major cost benefit in unbalancing his bid between price and transportation costs and has now been adopted for all federal agency's use as FAR § 52.247-60. Note however, that minor timing benefits could still accrue in contracts providing for progress payments because such payments will be based upon the item price while any transportation adjustment will presumably be made from the retainage at the end of performance.

The actual potential for problems in the area of transportation costs is low due to the precise manner in which the actual cost can be determined and the accuracy of preaward estimates of that cost. The potential for bid manipulation is far higher in areas where actual costs are speculative and the ability of the government to measure them is more limited. The inclination to press life cycle cost data to overly optimistic levels is also enhanced by the general procurement scheme. If the contractor's product obtains better LCC figures than he indicated, he receives nothing and will have given up an opportunity to have remained in the same competitive position with a higher price. Thus sound business judgement indicates that a contractor should provide data which reflect at least the lowest LCC which his product has any reasonable chance of attaining. There is no necessity to guard against bidders providing overly optimistic data in cases where product design or construction may be altered after award to move

POST AWARD REMEDIES

toward attaining such goals. In fact, one of the purposes of including life cycle cost evaluation factors is to encourage the development and production of products with reduced life cycle cost profiles.²⁸¹ If price adjustment provisions impose an excessive penalty, bidders may become conservative, providing data indicating LCC performance which they know can be achieved and abandon efforts to improve cost acquisition cost controls in their products. There is however, a real need to provide disincentives for bidders to provide intentionally underestimated data for products with established designs and measurable properties for new products if the bidder has no real expectation of being able to achieve the represented LCC performance level. One method of combating this desire is to provide minimum data figures which will apply if a contractor's figure fall below the government's best estimate of the practical minimum for that component. This approach, however, places limits, although perhaps minimal ones, on the ability of the life cycle cost analysis to correctly quantify items which might offer radical new methods to reduce LCC costs. Further in some types of procurements it could encourage all bidders to go with the minimum in an effort to remain competitive and thereby destroy the entire benefit of the life cycle cost analysis. This could be a

²⁸¹See text accompanying note 139.

POST AWARD REMEDIES

particular problem if development of the actual data called for by the government is expensive to generate.

3. Cost sharing

It is not always in the interest of the government to insist on a penalty arrangement which fully compensates it for the difference between "measured" LCC (established by test and/or post-award computation) and "target" LCC (the LCC figure used in award of the contract). When it is possible for target LCC to exceed target price by a wide margin, it may be possible for target LCC and measured LCC to differ by a huge amount. If a 100% penalty provision realistically has the potential of causing competent firms to withdraw from the competition or to include huge contingencies in their price, a cost-sharing arrangement may be in order.²⁸²

Whenever the product to be obtained will require the development of new technology, the creation of a new item or method of accomplishing some task, greater uncertainty will exist regarding the ability of either the government or the contractor to develop data allowing accurate LCC predictions. If the LCC factor is very large in comparison to price even small deviations in contractor data could result in a price reduction that would wipe out profit and run up gigantic losses on the contract. In such cases bidders may be most reluctant to provide, prior to award and the beginning of contract work, LCC data which is tied to such penalty provisions which fully indemnify the government

²⁸²DOD Publication LCC-2, "Casebook Life Cycle Costing in Equipment Procurement", Department of Defense, Washington, D.C., July 1970 at Case 3, page 36.

POST AWARD REMEDIES

for estimation errors. If a bid is made it may contain substantial contingencies in the form of very high estimates of LCC costs or significant price "padding". Intentional overestimation of LCC costs undermine the ability of the LCC analysis to provide meaningful discriminators for award determination. Price contingencies will drive up the price without any significant benefit to the government. The LCC factor involved can, of course, be abandoned, however, as already noted these concerns generally occur on only the largest LCC factors, those which offer the greatest potential for government cost savings. The answer is to structure the price adjustment formula so that the contractor bears less than the full dollar impact of data errors.

In an Air Force contract for the purchase of solid state oscilloscopes²⁸³ the payment provision provided:

The final amount to be paid the contractor shall be A_T if LCC_m is equal to or less than LCC_t . If LCC_m is greater than LCC_t then the final amount to be paid the contractor shall be less than A_T because the contractor has provided hardware that does not meet his predictions which were the basis for award. In [this event] the final contract price shall be computed as:

$$\text{Price} = [A_T] \left[1 - \left(\frac{3}{10 + A_T/3} \right) \frac{LCC_m - LCC_t}{LCC_t} \right]$$

The formula is complicated and designed to vary the amount of price adjustment based on two different ratios:

²⁸³Air Force Logistics Command RFP F41608-69-R-H306 (1969).

POST AWARD REMEDIES

first the ratio of contract price, A_T , to LCC_t , the target LCC performance as represented by the contractor prior to award, and second the ratio between the amount of the LCC cost underestimation, that is the actual or measured cost, LCC_m minus LCC_t , and the target costs. For a given LCC cost underestimation, say .1 or 10 %, the price reduction will depend upon the comparative magnitude of the price and the contractor's LCC estimate. Thus if the target LCC and price are bid at equal amounts the nominal price reduction ratio would be 6.33%; if, however, the target LCC were 10 times the price the reduction would be only 3.33%. If the contract price was \$10,000 in each case then the cost underestimation is \$1,000 in our first example and \$10,000 in the second. Thus the contractor's share of the underestimation would be 63.3% ($.0633 \times \$10,000/\$1,000$) in the first case but only 3.33% ($.0333 \times \$10,000/\$10,000$) in the second. As the contractor's profit is normally related to the contract price it is appropriate that the contractor's liability be reduced in proportion to the size of the life cycle cost/price ratio.

Note, however, that in the first example the price is reduced \$633 and in the second only \$333 despite the fact that the contractor "missed" the mark by 10% in each case. Such a result should only occur if the ability to accurately estimate the LCC data was directly a function of its magnitude in comparison to the item price. This appears

POST AWARD REMEDIES

unlikely in many cases. Further this equation allows reductions which exceed the actual cost impact of the underestimation in certain cases and could provide for price reductions of more than 100% for extreme errors. It becomes apparent, therefore, that some estimation of the variance which is likely in the price/LCC ratio and in the magnitude of underestimation which is anticipated is needed so that the price reduction equation can be drafted to operate in a reasonable manner over the expected range. Extreme equation results could lead to an inability to enforce the entire provision based on the prohibition against contract penalties.²⁸⁴

Nonetheless, the true test of the formula is its ability to prevent intentional bidder under estimation, the real purpose of the price adjustment process. Consider a bidder who believes that he can reasonably peg his product's life cycle costs at \$10,000 and that this, in fact, proves accurate. He desires an actual selling price of \$10,000 also. An examination of the cost impact of unbalancing his bid shows:

²⁸⁴See *Priebe & Sons, Inc. v. United States*, 332 U.S. 407 (1947).

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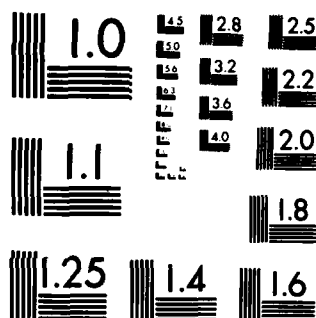
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POST AWARD REMEDIES

Potential Bid Price	Potential LCC Est.	Evaluated Price	Evaluation Benefit	Price* (realized)	Net** Effect
\$10,000	\$10,000	\$20,000	0	\$10,000	0
\$10,000	\$9,750	\$19,750	\$250	\$9,835	\$85
\$10,500	\$9,000	\$19,500	\$500	\$9,696	\$196
\$11,000	\$8,000	\$19,000	\$1,000	\$9,331	\$331
\$12,000	\$7,000	\$19,000	\$1,000	\$7,536	-\$1,464
\$14,000	\$5,000	\$19,000	\$1,000	\$5,367	-\$3,633

* Bid price less price adjustment.

** Reduction in evaluated bid less reduction in price received.

The formula works very well. There is some small competitive benefit with a slight unbalancing, however, these changes are probably well within the variance that legitimate bidders would face in estimating their products' LCC costs. As greater and greater unbalancing is attempted detriment, not benefit occurs and the potential bidder should be deterred from substantial unbalancing. Thus this particular formula appears to accomplish the overall goal.

As can be seen from this example, the use of cost sharing price adjustments adds greatly to the complexity of life cycle costing. Its use may be required for products where life cycle costs will be significantly greater than initial price and contractors will be unable to establish the data the government wishes to use in bid evaluation with

POST AWARD REMEDIES

adequate precision. Even in these cases other provisions which do not involve use of life cycle costing in the award process may be available to encourage good life cycle cost efficiency in design. Specifically in products with no "track record" Design-to-Cost²⁸⁵ and cost reduction incentive clauses should be considered prior to embracing the cost sharing price adjustment scheme.

B. LATENT DEFECTS AND WARRANTY PROVISIONS

In cases where the government cannot verify contractor representations prior to acceptance or final payment, it has occasionally relied on rights established as part of the government's standard contract provisions. Much more often however, specific warranty clauses are included in the contracts to preserve government remedies until verification is possible.

1. Latent defects and life cycle costing

The government has utilized the finality of acceptance as a method of controlling costs for many years. The theory is that if contractors are aware that their duties are basically limited to defects discovered by the government prior to acceptance overall cost to the government will be

²⁸⁵See Department of Defense Directive N. 5000.28, "Design to Cost", Department of Defense, Washington, D.C., April 1976. See also Air Force Regulation 800-11, "Life Cycle Cost Management Program", January 27, 1984.

POST AWARD REMEDIES

reduced. Thus the standard government contract forms have provided that final acceptance by the government cuts off any right to have the contractor remedy a product nonconformity. An exception exists where a defect is discovered after acceptance and that defect was latent or the result of "fraud, or such gross mistakes as amount to fraud."²⁸⁶

Latent defects are defects which were present in the goods at the time of acceptance but which could not have been discovered by a reasonable inspection.²⁸⁷ It should be clear that in cases where the government is unable to test contractor LCC representations prior to final payment it will not have been able to do so at acceptance of the goods, an event which proceeds final payment. Those situations which preclude use of price adjustment clauses should fit easily into the latent defect exception to the final acceptance provision, and there may be no need for an express warranty regarding contract representations of this type. At least one decision has supported this theory. In Keco Industries, Inc.²⁸⁸ the Armed Services Board of

²⁸⁶DAR Standard Form 32. Although FAR clauses do not contain this language it does not appear that a change in the applicable standard was intended. FAR § 46.705(b) (1984). See also Baltimore Constructors Inc., ASBCA No. 15852, 73-2 BCA § 10,281 (1973); FAR § 46.501 (1984).

²⁸⁷Geranco Manufacturing Corp., ASBCA 12376, 68-1 BCA § 6898 (1968).

²⁸⁸ASBCA No. 13271, 71-1 BCA § 8727 (1971).

POST AWARD REMEDIES

Contract Appeals held that the failure of an item to be able to operate for 500 hours at design capacity without failure as specified in the contract was a latent defect. The decision appears reasonable and stands for the proposition that in any case where it is impossible to verify an LCC representation which has been incorporated into the contract the government may, upon discovery of the defect within a reasonable time, seek any remedy which it may have been entitled to, had the goods been properly rejected at the time of tender.

The purpose of requiring contractors to furnish LCC data is to allow an accurate evaluation of the relative merits of the products of the various bidders. The solicitation would therefore require contractor's to supply this information or risk having their bids declared nonresponsive. However, as the information is designed only for use in making award it would not necessarily be incorporated into the contract itself. A latent defect must, however, be a defect and must denote a failure of the item to meet contract requirements. Thus whether it be considered a warranty or merely a contract requirement, all contractor provided data must be placed within the contract as an affirmative contractor obligation that the goods will

POST AWARD REMEDIES

achieve the life cycle cost performance represented in the awardee's bid or offer.²⁸⁹

Under the latent defect theory the government may retract its acceptance and utilize any of the remedies available had the government noted the deficiencies at delivery.²⁹⁰ Warranty remedies are generally less expansive providing specific, limited recourse for their breach. In point of fact overuse of the broad remedies permitted upon the determination that a latent defect existed in delivered goods could seriously damage the cost effectiveness of life cycle costing to the government. One of these remedies is revocation of acceptance and recovery of the contract price.²⁹¹ Such an election by the government long after delivery has been made and use began would be most extreme and, if used repeatedly, contractors might be expected to shy away from solicitations containing LCC evaluation factors or include sizable contingencies in bidding on them.

²⁸⁹Physical inclusion is seldom a practical problem as most bid submissions documents are directly incorporated into the contract. However, the solicitation language might not make clear that the LCC representations are intended to create a contractual obligation that the delivered product will achieve life costs equal to or less than those represented.

²⁹⁰See *Kaminer Construction Corp. v. United States*, 203 Ct. Cl. 182, 486 F.2d 980 (1973).

²⁹¹*Jo-Bar Manufacturing Corp.*, ASBCA No. 17774, 73-2 BCA ¶ 10,311 (1973).

POST AWARD REMEDIES

Merely including a limited express warranty, however, does not limit the government's rights to revoke acceptance upon discovery of a latent defect. In Mallory Engineering²⁹² a board of contract appeals held that an express warranty calling for the contractor to supply parts but not labor to effect repairs within the warranty period did not insulate the contractor from bearing the cost of labor expended in making repair of a latent defect discovered during the warranty period. This holding has now been specifically incorporated into the FAR.²⁹³ Thus in order to be protected from the full gambit of remedies which could flow from a finding that the product fails to meet life cycle representations made by the contractor, the "guarantee" must be confined to the express warranty provisions and must not be written into the contract in such a way that failure to meet the requirement could be construed as indicating that the product did not conform to the specifications on delivery. Inclusion of the life cycle cost guarantee solely within the warranty provision will not prejudice the government if the warranty is drafted to fully compensate the government for life cycle cost shortfalls. In the long run confining remedies for LCC defects which can

²⁹²DCAB NOAA-10-77, 77-2 BCA § 12,745 (1977).

²⁹³FAR § 46.705(6) (1984) provides:

warranty clauses shall not limit the Government's rights under an inspection clause in relation to latent defects, fraud, or gross mistakes that amount to fraud.

POST AWARD REMEDIES

never be detected on delivery to the terms of express and explicit warranty clauses should benefit the government. Such a policy should reduce uncertainty about the rights and obligations of the parties, avoid the possibility of significant contractor contingencies and limit the need for extensive litigation in this new area.

2. Warranties

A warranty is a promise or affirmation given by a seller to a purchaser regarding the nature, usefulness, or condition of the supplies or performance of services to be furnished. The principle purposes of a warranty in a Government contract are to delineate the rights and obligations of the contractor and the Government for defective items and services and foster quality performance. Generally, warranties survive acceptance of the contract items for a stated period of time or use, or until the occurrence of a specified event.... Thus they allow the Government additional time after acceptance in which to assert a [contract] right....²⁹⁴

In cases where data verification cannot be obtained prior to final payment the government may require a warranty that the product will achieve the life cycle cost performance specified in the bids or offers.²⁹⁵ The use of such provisions can extend contract administration for a number of years and present significant difficulties quite different from those of price adjustment provisions.

²⁹⁴DAR § 1-324.1 (1976). The FAR definition is limited to the first sentence of the DAR quotation. FAR § 46.701 (1984).

²⁹⁵See generally FAR Subpart 46.7 (1984).

POST AWARD REMEDIES

The problems with using warranties to ensure actual life cycle cost experience is as predicted are similar to warranty problems which arise in other contexts. As the property leaves the hands of the contractor before, often long before, the need to enforce the warranty there is always a question of whether a failure is due to a product defect or a subsequent event beyond the contractor's control. Department of Defense guidance states that this problem limits the type of product with which life cycle cost warranties can be feasible.

The apparent limitation [on the use of such warranties] is that the contractor must be assured of the operating conditions. ... If this criterion of environmental knowledge were satisfied, a warranted procurement appears to be feasible. ...

Thus typical equipment which could be purchased on this basis are:

- stationary boilers and generators
- room air conditioners
- standby utility equipment
- office machinery
- [Automated Data Processing] equipment

It is doubtful that a warranted procurement could be made on items subject to changing environments, military tactical operations, or misuse in operation or maintenance.²⁹⁶

A life cycle cost based warranty was used successfully in an Air Force procurement for the repair of military

²⁹⁶ DOD Publication LCC-2, "Casebook Life Cycle Costing in Equipment Procurement", Department of Defense, Washington, D.C., July 1970 at Case 2, page 12. Some of the equipment specified in the list is subject to misuse and this factor would appear to depend on the potential for misuse more than its mere possibility.

POST AWARD REMEDIES

housing. The solicitation provided that contractors would be required to offer a warranty regarding color fading and surface condition of the siding to be installed as part of the job. Bidders were free to offer any warranty period they desired but for each 5 years their warranty was short of 25 years their adjusted bid would be increased by the amount it was expected to cost the government to paint the project, reduced to current dollars.²⁹⁷ Use of a warranty in this procurement was in accord with the quoted DOD guidelines as the sole significant condition to which the siding would be exposed was historically documented weather.

The need to restrict the use of life cycle cost warranties to products with predictable life conditions is one of economic and not legal necessity. The government is technically free to draft broad warranty provisions which would require the contractor to assume the risk of almost any cause of product failure or defect. If carried to extremes the warranty becomes, effectively, an insurance policy. The problem with such an approach is that the additional procurement costs, due to both decreased competition, as conservative contractors drop out of the bidding, and higher bids to cover contingency repairs by those which remain, will probably exceed the value of repairs likely to be obtained pursuant to the warranty. On the other hand, if the warranty is restricted, as in many

²⁹⁷Fairchild AFB IFB # F45613-69-b-0138 (1969).

POST AWARD REMEDIES

traditional product warranties, to defects which the government can prove existed at the time of delivery, the government may be precluded from recovering in all but the most patent cases.

Under a "traditional" warranty the government must be able to either affirmatively establish the cause of the product defect to establish that the cause existed at delivery or, at least, establish that the government's operation, maintenance, storage and care were reasonable and in keeping with the type of use and care which the contractor's should have anticipated in making its life cycle cost representations. Neither of these showings is likely to be possible where complex mechanical assemblies are part of the product.

If a warranty provision is seen as being incapable of enforcement the government's economic interest will not be protected; in effect the government receives less than it bargained for. However, this is of secondary importance as the LCC warranty's primary purpose is not to obtain product repair but to ensure contractors bid their product's actual capabilities and that the evaluation process thereby selects a suitable product at the lowest cost to the government. Unfortunately if contractors believe that a clause will not be capable of realistic enforcement there is no disincentive

POST AWARD REMEDIES

to bidding a product's life cycle costs at unachievable levels.

Warranty remedies are generally thought of as providing for repair or replacement of the product. Where the sole purpose of the warranty is to protect the government's economic interest that is appropriate. With regard to life cycle cost warranties, however, consideration should be given to the use of provisions calling for monetary penalties. As contract performance is concluded, and the full contract price paid, it is perhaps not technically appropriate to consider such penalties "price adjustments" but the effect is generally the same.

Consider a case where a contractor warrants his gasoline powered generators will operate at 1 gallon per hour for five years, and the generators do so throughout the first year. In subsequent years, however, fuel efficiency shows slow but progressive deterioration. Repair of the equipment to make it achieve the contractor's LCC representations may be extremely expensive or even impossible. To require the contractor to accept the burden of making such an effort for the full 5 years may increase the contract cost radically. A better solution might be to provide that the government's warranty remedy will be limited to recovery of the costs of excess fuel consumption during the 5 year warranty period. If even this appears too

POST AWARD REMEDIES

heavy a potential burden, a cost sharing plan similar to that contained in price adjustment provisions would also appear feasible. In fact in most cases LCC warranty provisions can be structured to operate in exactly the same manner as price adjustment clauses. In cases with multi-year warranties it may be appropriate to increase the amount due the government to adjust for the time cost of money as the contractor will wrongfully have had the benefit of the use of the government's money from the time of payment until discovery of the product defect. A similar remedy which may be specified with regard to consumable products is to require the contractor to provide additional supplies to insure the government obtains the warranted utility. One Air Force contract specified that if batch testing of delivered aircraft tires failed to achieve the warranted number of landings the contractor would provide additional tires sufficient to achieve the total number of landings which the contractor represented would be achieve with the original number of tires purchased.²⁹⁸ The warranty also specified a dollar amount per additional tire supplied to compensate the government for the cost of mounting the replacement tires.

Although adding to the complexity of solicitation preparation and contract administration, experience has

²⁹⁸See DOD Publication LCC-2, "Casebook Life Cycle Costing in Equipment Procurement", Department of Defense, Washington, D.C., July 1970, Case 4.

POST AWARD REMEDIES

demonstrated that the government can create a bidding climate in which contractors will provide the government the best possible estimate of their products' life cycle cost factors; estimates on which the government can rely in making a viable contract award decision.

CONCLUSION

THE FUTURE OF PROCUREMENT LIFE CYCLE COSTING

The use of life cycle costing in making contract awards determinations adds complexity to an already intricate bureaucratic process. Historically, contract awards have been made on the basis of price alone and the effects of intellectual inertia appear to have perpetuated this situation. A further roadblock to increased use of LCC in government contracts has been the dichotomy between property procurers and uses within the government. Contract personnel are not generally responsible for operating and maintaining equipment once it is delivered to the government. They are, however, responsible for obtaining the government's needs with the least expenditure of procurement funds. There is little incentive, and often actual detriment, for a contract office to issue a solicitation which may ultimately save the government as a whole money, but which will likely cost its own agency or department more. These considerations make it clear that only when life cycle costing is encouraged or required from high government positions (those which supervise both buyers and users) will the use of life cycle costing become wide spread.

CONCLUSION

During the late 60s and early 70s the Department of Defense expended considerable energy and effort to test the feasibility of using life cycle costing in the award of contracts for a wide variety of items, both simple and complex. The result of these "experiments" was incorporated into two DOD publications which provided guidance on using LCC.²⁹⁹ These publications were labeled "interim" and were to be revised as further experience in LCC procurement techniques developed.³⁰⁰ After more than ten years there have been no revisions, and the publications are no longer available through the Government Printing Office. Although Federal agencies continue to express support for inclusion of life cycle costing in evaluation criteria,³⁰¹ such support is generally contained in "policy guidance" and is seldom applied in any comprehensive manner agency wide. If anything, Federal government dedication to broad implementation of life cycle costing has apparently declined in recent years.

Perhaps that is just as well. Application of life cycle costing to sophisticated products, such as weapons

²⁹⁹DOD Publication LCC-1, "Life Cycle Costing Procurement Guide (Interim)", Department of Defense, Washington, D.C., July, 1970; DOD Publication LCC-3, "Life Cycle Costing Guide For Systems Acquisitions (Interim)", Department of Defense, Washington, D.C., January, 1973.

³⁰⁰See LCC-1, *supra*, Preface.

³⁰¹See e.g. Air Force Regulation 800-11, "Life Cycle Cost Management Program", January 27, 1984.

CONCLUSION

systems, may be better deferred until many of the practical procurement problems which accompany an LCC evaluation have been worked out in contracts involving mundane items like automobiles and typewriters. Unfortunately LCC application to even these products is growing at a sluggish pace. Life cycle costing is feasible and desirable for a large number of items which the government buys on a recurring basis. In many cases evaluations considering life cycle costs have been used successfully for a given item a number of times. Yet the bulk of procurements for the same item continually fail to provide for LCC factors in the evaluation process.

This slow progress does not appear to be significantly linked to legal restrictions on the use of LCC evaluations. In general the Comptroller General has merely extended the general rules applicable to all procurements into the LCC area. Some "fine tuning" is underway in particularizing those requirements to the unique problems of LCC evaluations. Nevertheless the Comptroller General has created few limits on a procuring agency's discretion in deciding whether to use or how to use LCC analysis in the federal procurement field. States, which generally lag behind the federal government in implementing innovative procurement policies, appear to be at approximately the same level in actually using LCC considerations to limit the ultimate cost of purchased supplies.³⁰²

³⁰²See note 30, *supra*.

CONCLUSION

Admittedly numerous practical problems do exist in conducting LCC evaluations and, as with any new program or procedure, difficulties will continue to arise with some frequency. Only with repeated efforts in a given field or area will the "bugs" be discovered and methods developed to deal with them.

The General Services Administration, the responsible agency for all federal government data processing needs, has undertaken a program mandating evaluation of certain LCC factors in all federal purchases of data processing equipment.³⁰³ While this program has generated a sizable number of protests,³⁰⁴ progress is being made and as more and more contracts are awarded under the program, contractors in the data processing business are becoming familiar with each of the government's LCC concerns and are tailoring their equipment and proposals to these needs. What is needed now are similar programs which will develop particular mandatory LCC concerns for given items which the government repeatedly buys and which can clearly benefit from LCC. Contracting agencies can then be provided

³⁰³See Handbook, Teleprocessing Services Program, General Services Administration, October, 1978.

³⁰⁴See e.g., System Development Corp. and International Business Machines, Comp. Gen. Dec. B-204672, 82-1 CPD § 218 (1982); Computer Sciences Corp., Comp. Gen. Dec. B-195982, 80-2 CPD § 424 (1980); Tymshare, Inc., Comp. Gen. Dec. B-193287, 79-1 CPD § 317 (1979); Federal CSS, Comp. Gen. Dec. B-190708, 79-1 CPD § 4 (1979).

CONCLUSION

particular LCC "boilerplate" for various classes of common items. As experience is gained from these items, LCC can be extended to more sophisticated purchases requiring individualized LCC solicitation provisions and evaluation considerations. Under such an approach the statutory scheme adopted by New Jersey³⁰⁵ establishing presumptive consideration of LCC factors in both advertised and negotiated procurement of supplies could eventually be adopted by either regulation or statute. As experience and expertise grew more and more products could then be evaluated. The evaluations might also consist of an increased number of post-acquisition cost factors each with enhanced credibility made possible by extensive use. Absent such a considered, comprehensive approach use of Life Cycle Costing in government procurement is likely to progress at an uneven and painfully slow rate for the foreseeable future and the government will continue to purchase many millions of dollars worth of products without due regard to their ultimate cost to the taxpayer.

³⁰⁵See note 59 and accompanying text, *supra*.

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